January 27, 1936

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

THEY STOPPED PUTTING ENGINES IN BUGGIES FORTY YEARS AGO

but what has that to do with

ROLL NECK BEARINGS?

The extraordinary progress of American industry has largely been due to the promptness and consistency with which incorrect principles have been abandoned and new principles adopted.

When automotive engineers stopped trying to make automobiles by building over horse drawn buggies and began to attack motor car design as an entirely new vehicular problem, the automotive industry went ahead by leaps and bounds. Imagine this industry on plain bearings!

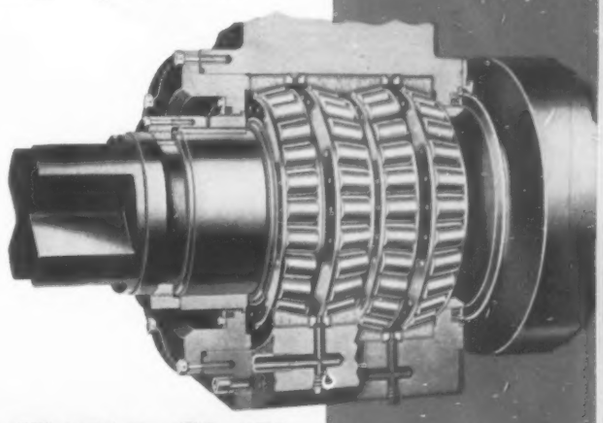
When railroad engineers recognized that the attainment of ultra high speeds was not merely a matter of building bigger locomotives, but demanded an entirely different type of equipment, the modern streamlined train was born—and with roller bearings, too.

And when rolling mill engineers realized that if mill speeds were to be increased, bearing life extended and costs reduced, a radically different type of roll neck bearing would be required, friction was superseded by anti-friction—roll neck bearing hazards were eliminated and a new era of rolling mill operation begun.

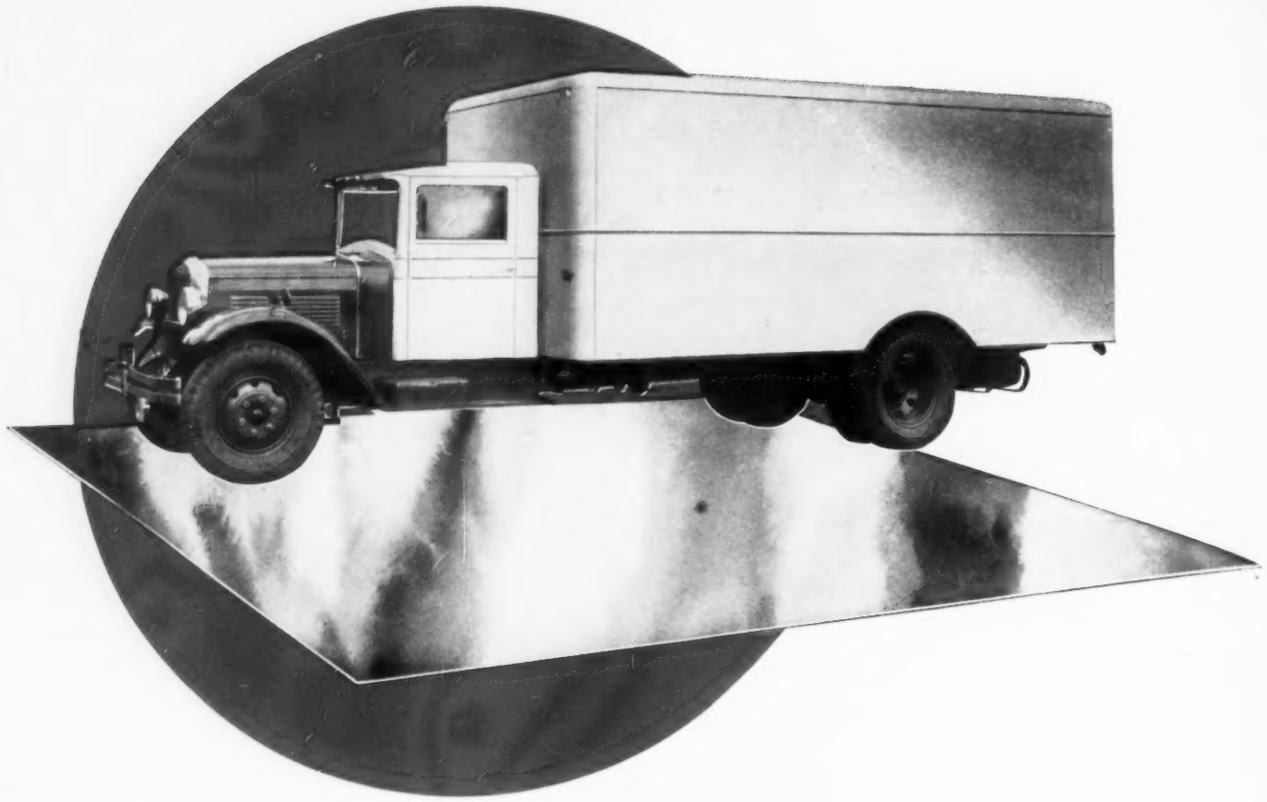
If a mechanical principle is fundamentally wrong, no amount of refinement can make it successful.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN BEARING EQUIPPED



TIMKEN *TAPERED ROLLER* BEARINGS



This finish is on a firm foundation . . .

Underneath the paint of this attractive delivery truck is Republic Galvannealed—a metal that among body builders and finishers has established a reputation for two advantages: The ability to take and hold paint, enamel and lacquer without expensive preparation of the metal. High corrosion-resistance which means long life, even though accident may mar or destroy the painted surface.

Republic Galvannealed is manufactured by coating iron or steel sheets with hot zinc spelter. Instead of permitting the coating to cool and form spangles, as on galvanized sheets, the coated sheets are held at a sufficiently high temperature to alloy the iron or steel base metal with the zinc.

In this way is produced a surface that is easy to paint, that retains the paint indefinitely, that resists rust and that may be formed to desired body shapes without cracking, peeling or scaling.

Full information on this modern metal that is fast becoming the choice of body builders, finishers and owners will be promptly forwarded upon request.

REPUBLIC *galvannealed*

REPUBLIC STEEL

Republic Steel CORPORATION

GENERAL OFFICES · · · · · CLEVELAND, OHIO

STEELS FOR EVERY AUTOMOTIVE USE

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For forty-eight years—IRON TRADE REVIEW

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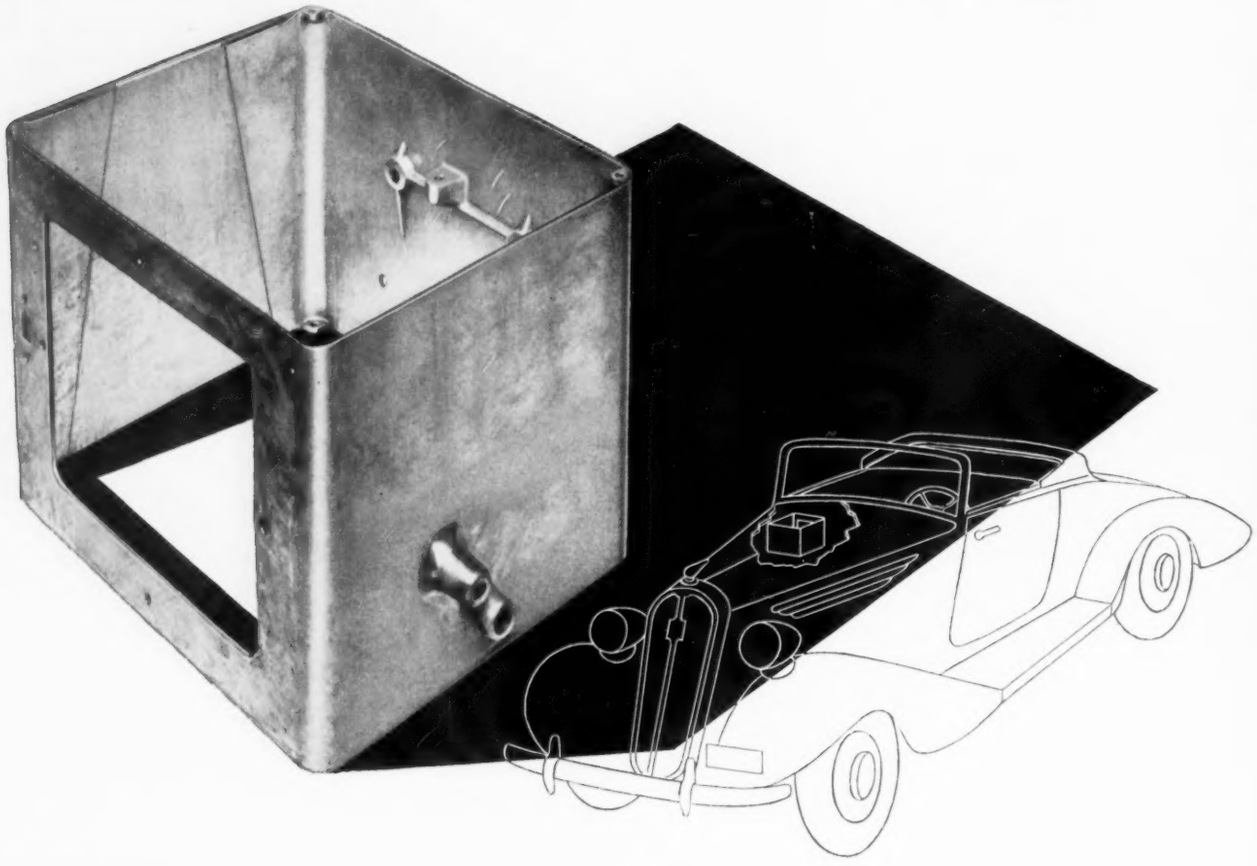
ZINC ALLOY DIE CASTINGS



THIS ONE TAKES THE BUMPS!

An automobile radio must hold its rigidity and the fewer the parts there are to loosen up, to rattle, the better. This ZINC Alloy Die Cast housing is rigid, provides strong bosses for connections and assembling elements . . . eliminates several joints, does much to eliminate rattles and microphonism.

The new ZINC Die Casting Alloys made with Horse Head Special ZINC furnish excellent die cast physical properties and can be counted on to maintain them over a long normal life. They have opened up so many possible applications for die castings that *many new products are now profiting from improved structural design, and production economies.*

It is worth every metal product designer's and manufacturer's time to investigate the possible advantages of redesigning for ZINC Alloy Die Castings. We will gladly furnish information on the possibilities and properties of these new alloys made with Horse Head Special ZINC.

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STEEL
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As the Editor Views the News

LAST week a congressman at Washington assailed mergers of industrial companies which are actuated by a desire to avoid increased taxation caused by amendments in the federal tax laws. His remarks (p. 22) imply that he considers it improper for a corporation to use legal methods to save money on taxes. This absurd view is a sad commentary upon the type of distorted thinking which is all too common among public servants today. It is a brand of logic that is responsible for the current glorification of riotous spending, waste and inefficiency and the implied condemnation of thrift, economy and efficiency.

• • •

Economy, Not Waste, Is Need

Whenever American industry ceases to consider economy a virtue, its days will be numbered. The urge to take in more money than is paid out—the profit motive—is fundamental, not only to the prosperity of industry but to the well being of the nation as a whole. Paying taxes that are higher than necessary, taxes that are unjust, or taxes that are levied for punitive purposes represents economic waste. Industry has every moral right to protect itself against this waste by the approved legal means. To neglect to exercise this right (p. 27) is particularly inexcusable today when the plain need of the country is economy.

• • •

Mid-January Conventions

Three important conventions held the spotlight last week. The enthusiasm of canners—happy over the fact that 1935 was their best year in history (p. 81)—was not lost upon the attentive minds of the visiting representatives of the tin plate industry. Walter S. Tower gave the members of the Institute of Scrap Iron and Steel Inc. something to think about (p. 14) when he explained that the development of new markets for steel will impose marked changes upon the scrap industry. The American Road Builders' association (p. 17) reports that a billion dollars is earmarked for road projects in 1936, which means greater opportunities for producers, fabricators and manufacturers in the metals industries. The road show, as in the case of the machine tool show last summer, reflected the tremendous strides that are being made in materials and equipment.

• • •

1935 Best Nickel Year

Readers who may be surprised to learn that world consumption of nickel during the first 10 months of 1935 exceeded that of the corresponding period of any previous year (p. 39) will find the answer in the expanding use of nickel throughout industry. Stainless irons and steels, alloy cast irons and the new low-alloy high-tensile steels are important factors in the increasing utilization of nickel. . . . Chromizing is in the process of being established on a commercial basis. Steel bars or billets (p. 48) are placed in a container with powdered chromium and certain compounds. The container is heated in a furnace, after which the chromium coated material may be rolled into sheets, strip, wire, etc. The resultant products have a stainless steel surface. The estimated cost is moderate.

• • •

Is Fifth of Steel Welded?

Reminiscent of the prospector's divining rod is the recently developed magnetic detector (p. 35), which is sensitive enough to locate buried pipe lines and other metal objects. . . . An authority on welding makes a guess that about 40,000 tons of welding wire was consumed in 1935 (p. 52) and that about 5,000,000 tons of steel was fabricated by welding in that year. Today this seems to be an imposing tonnage for that process, but in the eyes of observers in, say, 1940 the figure will appear to be absurdly low. . . . Manufacturers of products requiring electroplating will recognize the importance of reliable tests to check the thickness and quality of the coating. Data on weight, thickness and porosity appear in this issue (p. 37), and other tests will be presented later.

E. L. Shaner

Scrap's Service to Industry Lauded at Chicago Convention

STRENGTH of the steel industry, just as any other, depends upon its ability to find and hold customers, Walter S. Tower, executive secretary of the American Iron and Steel institute, told delegates at the eighth annual convention of the Institute of Scrap Iron and Steel at Chicago last week.

Mr. Tower declared if the strength of the steel industry is to be measured in terms of its customers, it follows that all those directly or indirectly concerned with the industry have a stake in the industry's markets.

Other notable addresses were given at business sessions of the convention on important subjects by Dr. Richard J. Lund, United States bureau of mines, Washington; Joseph E. Jacobson, Luria Bros. & Co. Inc., Pittsburgh; H. E. Leichenger, Leichenger, Bennett & Co., Chicago; Dr. Max Gerber, formerly executive director of the Scrap Iron association in Germany; Joel Claster, Luria Bros. & Co. Inc., Philadelphia, and resigning president of the institution; Michael V. Bonomo, Schiavone-Bonomo Corp., New York; Morris Machlin, Machlin Bros. & Bassow Inc., New York; and Thomas F. Kelly, the Thomas F. Kelly Co., New York.

Says Scrap Is Misnamed

The convention opened Jan. 21, with the meeting of the board of directors in the morning and committee meetings in the afternoon. Wednesday an open forum on "Scrap Costs and Merchandisig Methods" continued throughout the day. Thursday sessions were featured by the addresses by Dr. Lund and Mr. Tower.

"I have been thinking that the term scrap steel is, in some measure, a misnomer," said Mr. Tower, "because, as a matter of fact, the iron and steel material that you sell is in the process of being reclaimed from the uses in which it has been serving for a time. You recover and help to conserve iron and steel which otherwise might be lost, and turn it into a marketable commodity, an important raw material for a great basic industry."

He told the scrap convention delegates that the materials which they furnish the steel industry are important factors in the production of steel. They contribute to economies of production and they must be considered by the steelmaker as having possible important effects on his finished product.

He emphasized for the good of the industry the necessity to cultivate adequate consuming markets. He pointed out that the steel industry is no exception to the rule of change either as regards production or demand and he declared that if old customers disappear others must be found to take their places.

"To a degree a great industry like steel is always in a state of flux," Mr. Tower said. "In recent years many changes have been taking place not only within the steel industry, but also in the great and complex markets which its various products serve. Some of these changes are quite certain to have far-reaching effects on the future development of the steel industry."

Specifications Are Increasing

One of the fundamental changes, he declared, was the shift from the bessemer process to the open-hearth method of making steel. The increasing demand for "tailor made" steel and more detailed specifications has come to be the rule. This tendency is still growing and must be taken into account by producers.

He said a recent calculation by the American Iron and Steel institute indicated that the industry, in order to meet the almost endless variety of demands from its many customers, must be prepared to produce hundreds of different types of products in many thousands of different combinations of shapes, sizes and chemical analyses.

Speaking of alloy steel, Mr. Tower declared there must be complete and exact knowledge of what goes into the melt. To make such steel there can be no haphazard use of raw materials because, he said, some steel companies hesitate to use any scrap even of their own origin, unless its identity and analysis have been carefully preserved. In his opinion, the progress of demand for special steels is to be an item of no small concern for both the steelmaker and the supplier of raw materials which includes scrap.

He estimated that no less than 750,000,000 tons of steel are now in use in this country in all the many ways in which it serves our needs. Since 1929, he said the output of steel has fallen to a low ebb but he maintained the consumption of that huge tonnage of steel which had already been made into the form of divers products has gone on without abatement. Most of that huge tonnage is slowly but surely on its way back to the steel furnace.

"In spite of recent discouraging years and in the face of the uncertainties which still cloud the future, the steel industry senses the course of customers' needs and is making large outlays to improve its product and better its processes," said Mr. Tower.

New Mills Benefit Customers

"A large part of this expenditure has been and will be for new equipment, especially in the form of so-called strip-sheet mills. At present, 21 of these mills are in operation or in process of construction with a total rated capacity close to 8,000,000 tons annually.

"The aggregate investment which they represent is reliably estimated at $200,000,000. All of these dollars add nothing to the ability of the industry to produce raw steel. They have been or are being spent in order that customers may have all the benefits of advance in the art of rolling raw steel into certain classes of products."

He pointed out the development of new outlets for steel and these new markets he said are not without significance for the character of the product of the scrap industry. He declared the gradual introduction of more steel into houses may mean for a time a lessened speed in the circulation of the material from the furnace through the hands of some user and back to the furnace. In his opinion the steel industry is now moving toward a position where the term "prince or pauper" can no longer be appropriately applied to it, as in the past.

Selling Methods Must Change

Joseph E. Jacobson, of Luria Bros., Pittsburgh, spoke on "Fundamental Principles of Scrap Merchandising." He declared that it was his opinion that the day of large tonnages is over in the scrap business, that the present day broker regards a 5000 or 10,000 tons order as a large tonnage.

"There are numerous buyers who prefer to purchase their scrap as it is accumulated at prices previously agreed upon. There are other buyers, who, upon receipt of large customer orders wish to cover for an equal tonnage of the required scrap. These accounts are serviced and it is only natural that the seller demands what he considers a fair price for the merchandise—and if the price is fair, I mean that it must be fair for both

the consumer and producer of that grade of scrap.

"In no case in the last five years have I found any mill demanding that we sell unreasonable amounts of scrap short. The consumer has been educated to the inescapable fact that by creating a large shortage for his delivery, he is likewise creating higher prices for his subsequent requirements."

In Mr. Jacobson's opinion a scrap broker must be prepared to service his accounts by either method the consumer chooses, i.e., by the sale of scrap almost daily as accumulated by the brokers at agreed prices, or by the sale of a reasonable tonnage.

"Now as to the matter of fair price—or if we wish to confine the discussion to certain relationship, which I choose to do from the point of brevity—let us consider the relationship of scrap prices to pig iron prices," said Mr. Jacobson.

Sees No Relationship

"I have placed before you all certain figures. To make these figures timely and fitting the present date, they are the January averages since 1902 from the magazine STEEL (formerly *Iron Trade Review*), covering basic pig iron, valley furnace, and heavy melting steel at Pittsburgh. From these figures we glean certain incontrovertible facts.

"In arriving at what one would deem a constant relationship between the two commodities, the war period is naturally out so far as statistical information is concerned, because prices were set and were not based on a normal supply or demand.

"The point that I want to try to prove, is that the scrap price has no relationship to pig iron price from the angle of fixed value, but is variable and varies according to the rise and fall of ingot production rather than to its relative value to pig iron.

"In point of actual value most open-hearth technicians figure, using pig iron as a 100 per cent commodity, that No. 1 heavy melting steel is worth 105 per cent from the standpoint of yield of metal. Figuratively then, today with pig iron at $19, valley, scrap is now worth $19.95, valley—and is actually selling at about 75 per cent of that figure.

"Again bear in mind the difficulty of ascertaining the value of scrap to each individual mill; a mill possessing blast furnaces naturally figures that the top price it could pay for scrap is not based on the selling price of pig iron, but on the cost price. To a mill not possessing blast furnaces, the relative value of heavy melting steel must be figured from the point of cost of purchased pig iron.

"Thus, when scrap passes the cost figures of pig iron in price, certain self-contained mills decrease the use of heavy melting steel, leaving a freer floating supply for the mills that are not self-contained. Even then oftentimes scrap continues to rise in price because of a shortage of supply, but when it crosses the selling price of pig iron, wise observers begin to be cautious in their commitments. That is history.

Expanding Steel Market Seen

"However, the recent rise in ingot operations coupled with the fact that millions of tons of steel scrap have been exported during the past several years, taking this scrap out of our domestic revolving supply, would seem to indicate that we are gradually again approaching a normal balance of supply and demand in our scrap situation.

"It is easy to see from these records that during a period of prosperity, scrap always crosses pig iron in price before a decline sets in and, therefore, if we are to believe the prophets of prosperity, who seem to be in the majority today, we must feel that steel is in for a gradually expanding boom and if so, there is no reason why scrap should be so far under the pig iron price if operations continue at the present rate."

Dr. Richard J. Lund, of the bureau of mines, told the delegates at the convention of a survey of the ferrous scrap industry planned by the bureau. In his address he detailed data and statistics obtained from a very close study of conditions.

"In spite of its vital importance as an industrial raw material, the actual statistical record of consumption of ferrous scrap is indeed meager and faltering," he said. "The bureau of the census covered this item in its 1929 canvass, as you recall, and the research bureau of your institute conducted a similar survey of scrap consumption the same year. This is the only year for which reasonably reliable figures are available.

Difficult To Appraise Total

"Quarterly and annual statistics of revenue shipments of scrap iron and scrap steel by class I steam railroads, compiled and released by the interstate commerce commission, give us some indication of consumption.

"However, unknown additional quantities going into consumption tend to distort the picture and prevent use of these carefully compiled figures as an accurate gage of total ferrous scrap consumption.

"Outstanding among these indeterminables are the quantities of non-revenue scrap produced and shipped by the railroads direct to the consumers, and the amounts of scrap shipped solely by water.

"Until recently, apparently the railroads were far out in front as producers of scrap iron and steel, in which case undoubtedly the great preponderance could be classified as old material. In the last few years, however, it appears that the automobile industry has displaced the railroads as the most important supplier of ferrous scrap, a large proportion of which is lighter, new material.

"The consumer might be able to tell us a little about this phase of the problem; but no doubt your industry which collects, sorts, classifies, and markets the materials is the best

(*Please turn to Page* 84)

At a Business Session of Last Week's Convention of the Institute of Scrap Iron and Steel

—Kaufman & Fabry photo

Railroads Ask ICC To Extend Emergency Rates Indefinitely

CLASS one railroads of the country on Friday asked the interstate commerce commission to continue in effect the emergency increases in freight rates on certain commodities allowed in ex parte 115, increased freight rates of 1935, which will terminate on June 30 next unless the commission extends the rates.

The roads in their petition declare that these charges have not handicapped business and that their continuance is absolutely necessary to enable the carriers to meet increased costs of operation.

In their petition the roads say that "on the whole, there has been little complaint from the shipping public against the payment of these charges. They have not brought about any disturbance in business conditions, and have not resulted in the loss to competing agencies of transportation of any substantial volume of traffic. On the contrary, there has been, since the date these charges were made effective, a slight upward trend in petitioners' traffic."

The railroads point out, in support of their application, that the increases were granted to enable them to meet, in some measure, the rise in their operating expenses caused by higher cost of materials and supplies and the advance in the level of railway wages which resulted from the restoration in full on April 1, 1935, of former peak rates of pay.

Based on their operations for 1935, the roads estimate that the addition to their payrolls amounts to approximately $160,000,000 annually, and that the increase in their operating expenses resulting from the increased cost of materials and supplies over and above 1933 prices amounts to approximately $100,000,000 a year.

It is contended that the emergency adjustments in rates have contributed substantially toward enabling the roads to meet their increased costs of operation and have aided greatly in reducing the deficit in net income of many roads. These rates have yielded Class one roads an additional income of approximately $65,000,000 for the period from April 18 to Dec. 1, 1935, and it is estimated that they will produce more than $100,000,000 in additional income for the full year of April 18, 1935, to April 18, 1936.

Wage Rates Maintained

The petition states that operating expenses for 1936 will reflect the payment of the basic rates of pay of railroad labor unaffected by any reductions, and the payment of the reductions, and the payment of higher costs of materials and supplies.

In the application filed the railroads ask "that the interstate commerce commission authorize them to continue without an expiration date the charges heretofore authorized by the interstate commerce commission by this proceeding now in effect; that the commission institute promptly and as speedily as possible conduct such an investigation as may enable the commission to determine and find that the charges should be continued in effect and that their freight rates and charges, as increase by the amounts of the emergency charges, are and for the future will be just and reasonable, and not in excess of such reasonable rates as are necessary to enable petitioners to provide the adequate and efficient railway transportation service required in the public interest."

Tennessee Buys Virginia Bridge Co.

VIRGINIA BRIDGE & IRON CO., Roanoke, Va., with plants also at Birmingham, Ala., and Memphis, Tenn., has been taken over by the Tennessee Coal, Iron & Railroad Co., Birmingham, a subsidiary of the United States Steel Corp.

Stockholders of the Virginia company, of which C. Edwin Michael is president, ratified the sale Thursday. It is understood that the Tennessee company will operate it as a subsidiary, supplying its steel requirements from its Birmingham mills.

Fabricating capacity of the Virginia company, which was formed in 1895, is 125,000 tons annually. The company is incorporated for $3,000,000, of which $2,500,000 is outstanding.

This fabricating capacity of the Virginia company supplements the facilities of the Tennessee company and provides an outlet for the latter's plain material.

Steel Index Is Ready

The index to Volume 97 of STEEL, *for the last six months of* 1935, *now is ready for distribution. Copies will be sent to all subscribers requesting them.*

Consumption of Tin Rises

January bulletin of the International Tin Research and Development council, New York, places apparent world consumption of tin in the year ended November, 1935, at 138,906 gross tons an increase of 18.2 per cent over the preceding year.

New Mark of Quality

This trade mark of the Air Conditioning Manufacturers' association, Southern building, Washington, is expected to become the hall mark of the air conditioning industry. Leading manufacturers of air conditioning equipment have adopted it and supported the association in formulating standards and equipment rating

Road Builders, Big Users of Steel, See Billion-Dollar Year

HAND labor in road and other forms of public construction may be satisfactory in an emergency—as a cloak, for instance, to cover the dole—but when contractors take a job to lay a pavement, build a bridge, or a dam, they mean business.

It is for that reason that during the depression, when municipal, state and federal governments have placed emphasis on hand labor, mechanical equipment for speeding up such work has been developed to a new pinnacle of perfection.

The strong inference from the thirty-third annual road show of the American Road Builders association in Cleveland last week, in which leading steel manufacturers participated, is that hand labor methods are not going to last much longer.

Equipment valued at $3,500,000 was exhibited, and the association forecast a billion-dollar expenditure by the public for road improvement this year. Notable also among the exhibitors were departments of the federal government promoting highway construction, and some state departments, showing the advantages of good roads from economical and safety standpoints.

Nearly a Billion Earmarked

The association's estimate of expenditures this year are predicated on the following factors: $125,000,000 federal aid, to be matched by the states; $125,000,000 from the states, if they match federal aid; $200,000,000 emergency relief funds for highways, secondary roads and streets; $200,000,000 emergency relief funds for grade elimination; $300,000,000 potential emergency relief funds for highways, streets and grade crossings, not yet allotted; $1,000,000 estimated state funds in excess of requirements to match federal aid. Legislation for a substantial portion of this program has already been passed by federal and state governments.

There were 195 exhibitors from 100 cities and 24 states. The largest single item of equipment, a power shovel weighing 72 tons, 24 tons heavier than any unit ever before displayed at a road show, was placed on exhibition by the Lima Locomotive Works, Lima, O. From this, the exhibits, as respect to size, ranged all the way down to instruments no bigger than portable radio sets, for detection of earth tremors, and multi-lens highway warning signals. Educational features were exhibited by six states, in addition to the United States bureau of roads. Russia, Cuba, Mexico, England, Canada, South America and Central America sent representatives. There were more than 100 speakers for convention sessions. There were daily broadcasts of dramatic sketches to increase public interest in road building, and 25,000 attended the show.

From a steel standpoint, probably one of the most interesting features of the show was the trend—plainly discernible by comparison with prior shows—toward the use of huge rubber tires on large material handling equipment. Far from disconcerting steel men, however, this appeared to be of advantage to them, for the weight in steel lost by the substitution of rubber for steel treads of tractor type is more than compensated for by the gain in steel in larger size bodies—and likewise in the wheels themselves.

In the building of the great dams—Boulder, Grand Coulee, Fort Peck, and in the Colorado river-Los Angeles water system, Tennesee valley, and elsewhere—it was found that more material could be handled in less time on pneumatic cushions, going through anything, than on steel treads. This knowledge has been applied extensively by builders of conveying equipment.

For just one of these tires, with rubber 3 inches thick, 19½ inches in cross section, 63 inches in overall diameter, weighing 600 pounds, a steel wheel, weighing 425 pounds is necessary. Such wheels were displayed by the West Steel Casting Co., Cleveland, and others. Each complete wheel is capable of supporting a load of 9000 pounds, and two sometimes are used in tandem—that is, four altogether on the rear axle. With air pressure of only 50 pounds, the tire spreads, forming a cushion, laying its own road, through deep mire, over coarse ruts.

Dump trailers were exhibited capable of carrying 30 cubic yards, where a few years ago 8 and 9 yards were "capacity" loads. There were any number of combination trucks and shovels; the bodies themselves built to dig into the earth, scoop it up, and telescope into the frame.

The Iron Road—at the Road Builders' Exhibition

Interlake Iron Corp.'s display at the road builders' show in Cleveland last week was a section of a road laid with triangular plates, diamond studded on the upper surfaces, with three-point suspension underneath to grip the material, generally concrete, in which they are laid. Interlake is completing a foundry at Toledo, O., to use hot metal from one of its blast furnaces for casting the plates, having acquired American rights from British interests which originated the design. For further details see the accompanying article

Diesel engines were exhibited by the score.

The Interlake Iron Corp. exhibited the triangular cast-iron paving blocks. These blocks, as first reported in STEEL, were developed in England. E. W. Davis, head of the University of Minnesota school of mines, experimented with them and laid a short road section on a road near that school, two years ago. Interlake, a Pickands-Mather affiliate, acquired the American patent rights, and is now building a foundry at Toledo, where it also has blast furnaces, for casting them. So far these plates, or blocks, have been used in this country only experimentally, although a number of roads have been built with them in England, and variations of the pattern have been used in roadbuilding in France.

The special feature about the Interlake plate is the three-point projections underneath them, where they form a triangle, a tripod-spur which prevents shifting in the material in which it is laid—generally concrete.

United States Steel Corp. subsidiaries had a complete miniature layout of a landscape with modern road, bridge, subway, road guards, signal lamps, culverts etc. The rather picturesque exhibit, in which concrete played an important role, was cut away in parts to show the hidden roles played by steel—reinforcing rods and mesh in the roadway; steel beams in the concrete pillars; while, of course, the complete steel bridge was plainly in view.

Steel Guard Post Brackets

Bethlehem Steel Co., and its subsidiaries exhibited similar steel materials. The Kalman Steel Corp.—that is, Kalman until recently merged entirely, identity and all, into Bethlehem—showed a new type of improved steel guard post bracket. As recently pointed out in an article in STEEL, great ingenuity has been shown by steelmakers in varying designs of these brackets, to provide a cushion and permit lateral play of the steel plates. Kalman's is a semi-circular bracket, bolted to a wood post, with lips or clips bent outward to engage the plate.

The Toncan Culvert Manufacturers association, featuring materials made by Republic Steel Corp., and the Armco Culvert Manufacturers' association, sponsoring American Rolling Mill Co. products, also exhibited road guards and culvert.

Some of the other steel-allied industries which exhibited their products were Air Reduction Sales Co., Allis-Chalmers Mfg. Co., American Brake Shoe & Foundry Co., American Casting Co., American Manganese Steel Co., Blaw-Knox Co., Chicago Pneumatic Tool Co., Cleveland Tractor Co., Harnischfeger Corp., Hyatt Roller Bearing Co., Pittsburgh Steel Co., and Wellman Engineering Co.

Production

STEEL production declined 2½ points last week to 50 per cent, 3 points below the level in the same week of 1935, but considerably higher than the 33 per cent rate experienced in the comparable week of 1934. Pittsburgh, Buffalo, eastern Pennsylvania, Youngstown and New England lost operating ground last week; Wheeling, Birmingham, and Chicago lifted slightly, while other districts held firm. Extremely cold weather in the Pittsburgh district, resulting in several finishing mills closing, was a factor in the 3½ point loss registered there. Further details follow:

Chicago—Rose ½ point to 53 per cent. This is the best rate so far this month, but is a decrease from the average a year ago, as well as being under the fourth quarter level. A more substantial pickup is anticipated about the middle of February. Twenty of the district's 41 blast furnaces are active, six more than were in blast a year ago.

Detroit—Unchanged at 88 per cent, local producers keeping 15 out of 17 open hearths active.

Cleveland-Lorain—Unchanged at 67 per cent, Republic Steel Corp. continuing with 6 of its 14 open hearths; Otis Steel Co. with all 8, and National Tube Co. all 12 units.

Pittsburgh—Dropped 3½ points last week to 37½ per cent. This reversal in the operating trend is believed only temporary, since bookings indicate hope of recovery early in the current quarter. Finishing mills are holding fairly well, with sheet mills operating at 65 per cent and strip mills at 50 per cent. Tin mill operations are down 10 points to 60 per cent. In the past week, Corporation plants averaged 40 per cent operations, and independents 45 per cent.

Outburst of extreme cold weather, down to 16 below zero, slowed down mill operations last week end. This is the coldest it has been here since 1899 and the first time in years that both the Allegheny and Monongahela rivers were frozen from bank to bank. Some finishing departments, without heat, suspended until the weather moderates, but others fearing freeze-ups operated through Sunday.

Wheeling—Addition of one open-hearth furnace brought operations up to 70 per cent, with 26 open-hearth furnaces melting out of 37.

Birmingham—Up 10 points last week to 51 per cent. Tennessee Coal, Iron & Railroad Co. is preparing an additional blast furnace and three open-hearths for operation Jan. 30. The rail mill at Ensley is scheduled to resume about Feb. 3 for a period of three to four months steady production. The rate is expected to reach 63 per cent this week.

New England—Down 10 points to 83 per cent, with indications this rate will be maintained this week.

Central eastern seaboard — Off fractionally to 36½ per cent. Output so far this month has not been up to earlier expectations; however, little or no further recession is expected this week and the general belief is that as February gets under way the upward trend will be resumed, notwithstanding the fact that at present finished steel demand is considerably mixed.

Cincinnati — Unchanged at 75 per cent last week, 18 of 24 open hearths being operated as in the preceding week. Schedules, subject to change, call for retention of this rate.

Buffalo—Declined 15 points to 30 per cent last week, due to four open hearths being taken off. A 12-point

Small Pig, Iron Road Plate, New Merchandising

PIG iron has at last joined the raw materials which are becoming increasingly "merchandising conscious."

For generations, the merchandising of pig iron has followed along certain inflexible lines. Merchant furnace interests generally have taken ore, coke and limestone, made iron, and poured pigs weighing 80 to 110 pounds.

Recently, however, the Interlake Iron Corp., leading merchant producer, introduced a pig weighing 38 to 42 pounds. The reason is founded on a principle as old as the hills—that it takes less time and therefore less heat to melt small particles of a metal than it does to melt the same weight of the same metal when in a solid state. Three hundred or more foundries are using the iron since its introduction just a few weeks ago.

Interlake's exhibit of "The Iron Road" was one of the features of the national road show in Cleveland last week (p. 17). The triangular iron plates will be poured from hot metal from the company's Toledo furnaces. Instead of being cast into pigs first, the metal for the plates will pass direct from a blast furnace into an auxiliary air furnace to keep up the temperature, and from this it will be cast into plates. An effort is being made to popularize the use of these plates for certain road purposes in the United States.

In other words, a merchant furnace interest is seeing what can be done to promote the use of its material. And thus the lowly pig is being modernized, and "dressed up," so to speak, to go places.

gain to 42 per cent is expected this week.

SHEET ACTIVITY EASES MODERATELY IN DECEMBER

Daily average steel sheet sales, production and shipments in December, as reported by the National Association of Flat Rolled Steel Manufacturers, Pittsburgh, were lower than in November. Sales declined from 9636 net tons to 6558 tons; output from 7484 tons to 6734 tons, and shipments from 7115 tons to 6292. Totals for December: Sales, 203,318 tons; production, 208,774 tons; shipments, 195,077 tons. Total sheet capacity in the United States for December was approximately 500,000 tons, and the capacity on which the association's figures are based was 303,000 tons.

Steelmaking Operations

Percentage of Open-Hearth Ingot Capacity Engaged in Leading Districts

	Week ended Jan. 25	Change	Same week 1935	Same week 1934
Pittsburgh	37½	— 3½	38	22
Chicago	53	+ ½	59	30
Eastern Pa.	36½	— ½	28½	23½
Youngstown	61	— 3	64	32
Wheeling	70	+ 2	95	64
Cleveland	67	None	79	64
Buffalo	30	—15	44	32
Birmingham	51	+10	31½	52
New England	83	—10	68	86
Detroit	88	None	100	46
Cincinnati	75	None	†	†
Average	50	— 2½	53	33

†Not reported.

MODERNIZE CHAPMAN-PRICE

Rolling mills of the Chapman-Price division, Indianapolis, of the Continental Steel Corp., Kokomo, Ind., have been shut down for 30 days for alterations and extensions. The finishing departments continue to operate. About $500,000 is being spent on modernization.

CANADIAN STEEL OUTPUT OFF, IRON UP, IN NOVEMBER

Canadian output of steel ingots and castings in November, 1935, was 94,074 gross tons, compared with 95,016 tons in October, and 57,050 tons in November, 1934. The 11-month total was 836,794 tons, against 700,187 tons in the like period of 1934.

Pig iron production amounted to 64,562 tons, highest monthly total since June, 1930, and compares with 45,521 tons in October, and 38,968 tons in November, 1934. For the 11 months ending with November, pig iron production amounted to 529,147 tons, a large increase over the 364,631 tons produced during the first eleven months of 1934.

Empire Making Tin, Terne Plate

EMPIRE SHEET & TIN PLATE CORP., Mansfield, O., about Feb. 1 expects to complete installation of equipment for making tin plate, its capacity to be 500,000 base boxes annually.

Empire is converting its North plant at Mansfield for tin plate, and will cease production of sheets there. The hot mills at this plant are being supplied with continuous pair and sheet furnaces. Other installations include new pickling and annealing equipment, along with three-stand tandem cold-rolling facilities.

A new warehouse and shipping department has been constructed, equipped with a temperature controlled heating unit. Empire will offer the trade a type of tin plate known as "pack tin" in view of the fact that the sheet bar will be converted by hand mill practice on the hot mills.

C. H. Stamm, as manager of plants, heads up Empire's production activities. John Patton, formerly with Wheeling Steel Corp. and Bethlehem Steel Co., has joined Empire as general superintendent of the tin plate division. Mr. Barto, formerly with Republic Steel Corp., at Warren, O., is tin house superintendent.

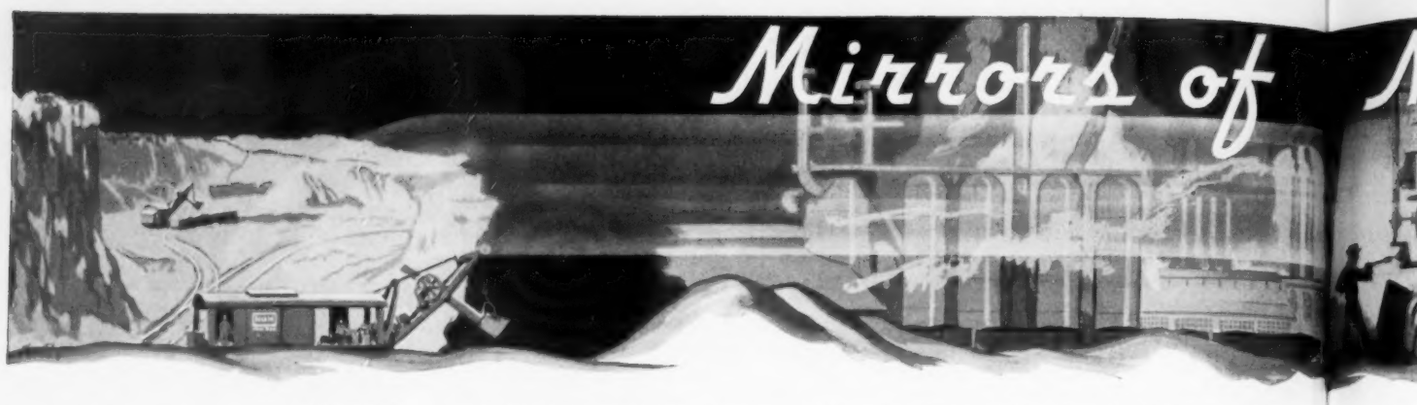
Long terne sheets are now being produced at the South plant in Mansfield, where new equipment for processing and coating has been installed. Robert Carney is in charge.

Norton Marks Anniversary

Commemorating the fiftieth anniversary of the company, the Norton Co., Worcester, Mass., at the close of 1935 issued a special souvenir number of *The Norton Spirit*. Profusely illustrated and enclosed in a gold-pebbled cover, spiral bound, this special issue depicts the growth of the Norton Co., lists all employes and their service records, depicts the company's housing project, various sales and employe groups, employe activities, and company products. The issue was distributed only among employes in all Norton plants and branch warehouses.

Presenting American Rolling Mill Safety Trophy

The ARMCO Iron Man, bronze safety trophy, awarded annually to that group in the operating divisions of the American Rolling Mill Co., Middletown, O., which has had the lowest major accident frequency record during the past year, was presented to the wheel works department of the Butler, Pa., plant on Jan. 13. The wheel works group won the trophy for the 1936 period by having a clear record of no major accidents. The ARMCO Iron Man is the work of the late Clement J. Barnhorn of Cincinnati. Inscribed on the base of the trophy are these words: "The Straight-Thinking Man Respects Safety." C. H. Murray (right), assistant to the president, American Rolling Mill Co., is shown presenting the trophy to George Bayer, superintendent of the wheel works division at Butler



DETROIT

DIMINUENDO became more noticeable in the automotive chorus last week. Though this was reflected to a greater degree in material releases than in actual assemblies, the anticipated reaction from the unusual fourth quarter pace definitely appears to be growing.

Last week, 87,415 units were assembled, a decline of 7755 units from the first week preceding and 11,215 fewer than the second. A further recession in production is seen for February, with six weeks a common prediction as to the tenure of the lull.

When all the facts are examined, however, the industry needs no apologies for its showing to date. By the end of January about 1,400,000 units of 1936 models will have been built in the United States. Last year the first four months' output of new models was somewhat over 1,200,000 cars and trucks. Considering that midwinter never has been an open season on automobile customers, it is only natural that manufacturers should display some momentary caution along with their optimism over the 1936 outlook as a whole.

Ample Stocks Out

Usually, the first quarter has developed a steady rise in output, a large portion of which went to stock dealers. Spring expansion in retail sales then caught on and pushed assemblies to a peak some time in the second quarter. Fall introduction of cars, however, now finds dealers adequately stocked in most instances. Retail buying, while highly satisfactory—all things considered—appears insufficient to support a 400,000-unit monthly output such as prevailed at the year-end. The result, a slowing down in production until spring's sales stimulus arrives.

In the meantime, sales departments, while fearing some letdown in retail buying before the second quarter, are confident the trend will be upward thereafter. Course of the bonus bill through congress is being eyed hopefully since some small-scale "straw votes" among local plants have shown that a large share of this money, if paid, will be spent for automobiles. In some surveys as much as one-half the bonus payments is indicated as destined to go motorward. The industry does not expect to receive anywhere near that large a share, however. An American Legion survey states that nearly 370,000 cars and trucks will be bought with about $123,000,000 of bonus money.

Detroit talks much of the used-car problem. This probably is natural since it has constant reminders in the numerous dealer yards about the city, most of them filled almost to overflowing. Unquestionably this situation is hurting new car sales. Many instances are heard of dealers who have discouraged buyers from taking delivery of new cars, telling them that better allowances can be made on trade-ins later in the year when the used-car load has been lightened.

Co-operation Might Help

Dealers have more trouble disposing profitably of 1935 and 1934 cars than those of older models because of the generous allowances frequently made on the former in connection with 1936 purchases. Pontiac has followed Chevrolet's lead in giving dealers a $20 allowance on every used car junked, the former's plan extending through February.

It has been remarked that manufacturers as a group could well afford to co-operate in the elimination of obsolete and unsafe vehicles, if only to further the safety program in which the Automobile Manufacturers association recently announced it will participate actively. That the industry has officially taken steps to combat the traffic toll is regarded as both wise and necessary, if interference from public officials and an actual obstacle to sales are to be avoided.

Incidentally, the industry is opposing the "horror" campaign to stimulate safety, and favors a campaign to educate rather than terrify drivers. It has found in its own plants that the safety is promoted by rewarding the careful man rather than scaring the reckless one.

The lull felt by steel and other material suppliers so far has not been universal in its sources. Ford, for instance, has shown but little slackening in releases. Buick is understood to be planning still heavier schedules for February. Recently it has been assembling 3750 units weekly.

Interests which took in the heaviest supplies of material late last year have been the quickest to curtail receipts recently, Chrysler being prominent among these. Body plants also are slowing down, Briggs being reported to have laid off 1600 men lately.

Automotive employment generally has been well maintained, companies reducing hours, when necessary, rather than the number of workers. Industrial employment as a whole in Detroit, however, is about 25,000, or 8 per cent, ahead of last year and the welfare load has been cut nearly 60 per cent from the total of 12 months ago.

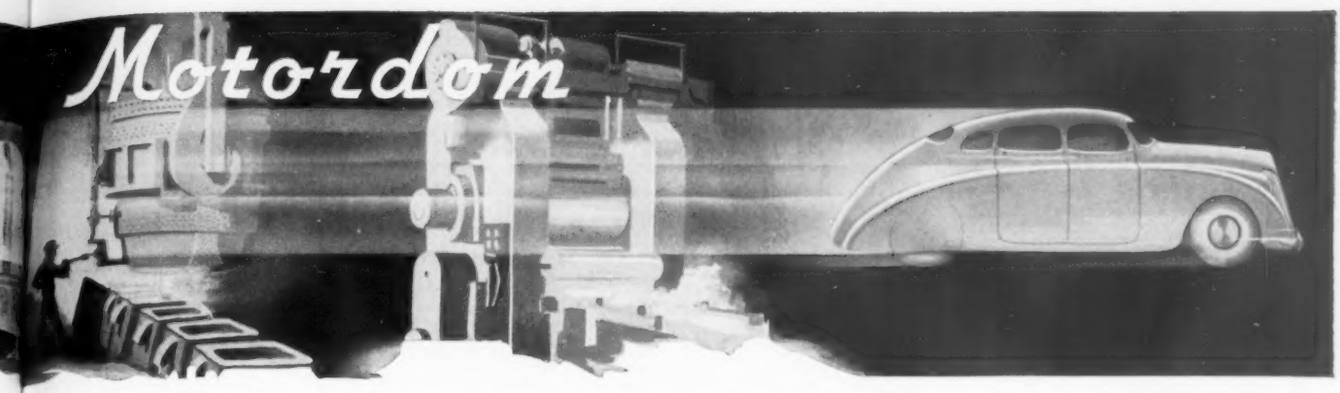
Actual tool and die work for 1937 models has not yet been closed in volume but planning is progressing and the coming year looms as a busy one for the tool and die industry. Except in a few instances, bodies, hoods and fenders of current models represent little change from the 1935 editions. Major revisions are looked for in 1937, at least to the extent that considerably more die work will be necessary than was true the past year.

New Plant Mostly Windows

In this connection it is probably no coincidence that three of the big body companies—Fisher, Briggs and Murray—are expanding their die-making facilities. The huge new plant to be operated by Fisher at Grand Rapids—to be known as the Grand Rapids Stamping division of General Motors Corp.—eventually may cost $7,000,000 and will be used to supply stampings and metal parts to various plants of the parent company.

In the past, Grand Rapids has not actively sought automotive companies to locate plants there, reputedly because it feared a disturbance of existing labor relations, and until now Hayes Body Corp. was the industry's principal representative in the furniture center. The new General Motors plant, when in operation, is expected to employ about 2000 and will have a floor space of 400,000 square feet. Eighty-two per cent of the total wall surface will be devoted to windows—a valuable asset to illumination.

The die shop will occupy two craneways at the front of the plant, 75 x 260 feet, while five of similar size will form the press shop. Unusually substantial foundations will be required for the press shop because of the nature of the ground and the size of the presses necessary to produce the tur-



ret tops. The Grand Rapids plant will be Fisher's twenty-sixth unit.

Detroit hears that Graham is contemplating re-entering the commercial car field. Graham was a highly-regarded name in the truck industry a number of years ago, when Chrysler acquired it. After the sale the Graham brothers turned to passenger cars via the old Paige company. One condition of the Chrysler purchase is understood to have been that Graham was to remain out of the truck business for a period of time, now elapsed. Chrysler has carried on in the commercial car industry with its Dodge and Fargo divisions. Trucks, incidentally, had an active year in 1935. Production of more than 730,000 units was the highest for any year except 1929 when 826,817 were built.

New Commercials Unveiled

Mack is invading the low-price truck and bus field with a line of seven light Mack Jr. models, ranging from one-half to 2-3 tons. This is a radical departure from the Mack policy of manufacturing only heavy-duty commercial motor vehicles. The Mack Jr. line is featured by large fenders, and abundance of chrome plating, a chrome grill, deluxe hub caps and bumpers, and forged disk wheels. There also is a transit type bus with the engine in front, seating 21 passengers. Engines have alloy iron cylinders, Lo-Ex aluminum pistons, and stellite valve inserts.

Chevrolet expects to turn out 110,000 jobs this month, but is commencing to curtail and will fall below this figure in February. Jan. 16 marked the production of the six millionth six-cylinder unit for this interest. More than one-half of the 11,000,000 cars Chevrolet has built have been six-cylinder models.

Building activity in Detroit feels the effect of the good automotive year in 1935. Permits rose from $8,800,000 in 1934 to $21,000,000. Residences alone accounted for more than $9,000,000. The pickup continued through December when permits of all types totaled about $2,500,000 against $780,000 a year ago.

Ford's building program, originally estimated a year ago to cost about $20,000,000 is expected ultimately to cost more than $30,000,000. Most of the additional expenditure will have been completed by this summer. Two new batteries of by-product coke ovens now are under construction. Various improvements to the plant gas system are planned, including a large tunnel to carry gas from the coke ovens to a new 10,000,000 cubic foot gas holder. Another large main will carry blast furnace gas to mixing stations.

Critical labor conditions are conspicuously absent here. Efforts of John L. Lewis, fiery coal union leader, to organize automotive workers are being watched, though his movement has only started to get under way. In the light of the attitude of manufacturers, it is questionable whether Mr. Lewis can hope to duplicate the success he has experienced in dominating the bituminous miners.

If recommendations of automotive engineers, as presented at the annual convention of the Society of Automotive Engineers, are followed, the car of the near future will have its motor placed at the rear; there will be neither running boards nor hood, its body and frame will be a single unit, gear shift lever and hand brake will be on the instrument panel or steering wheel; air-conditioning will be available; and more aluminum will be used in its construction. The start toward adoption of various of the above features already is apparent, but managements are wary of taking the plunge with rear-engine mounting.

Automobile Production

Passenger Cars and Trucks—U. S. Only
By Department of Commerce

	1933	1934	1935
Jan.	128,825	155,666	292,817
Feb.	105,447	230,256	335,700
Mar.	115,272	338,434	429,834
Apr.	176,432	352,975	477,746
May	214,411	330,455	364,727
June	249,727	306,477	361,321
July	229,357	264,933	337,044
Aug.	232,855	234,811	240,051
Sept.	191,800	170,007	89,805
Oct.	134,683	131,991	275,021
Nov.	60,683	83,482	398,024
Dec.	80,565	153,624	407,804
Year	1,920,057	2,753,111	4,009,894

Estimated by *Cram's Reports*

Week ended:

Jan. 4	65,840
Jan. 11	98,630
Jan. 18	95,170
Jan. 25	87,415

Motordom Miscellany

Ross Gear & Tool Co., Lafayette, Ind., has developed a new steering gear, the feature of which is a double ratio worm. This provides ultra easy wheel turn for parking and slow speed driving, and faster action for straight ahead driving. The former permits easier parking; the latter enables drivers to make faster turns at high speeds, and makes for safety and stability. . . . A large automotive parts manufacturer is perfecting an automatic gear shifter for which it acquired the rights at a substantial price and will offer it commercially before long. . . . Widespread use of heaters has developed a market for small fans and other equipment to defrost windshields in cold weather, but these devices are superfluous at other times. Motorists wonder why a permanent piping system to conduct hot air from beneath the hood to the windshield is not generally adopted by car manufacturers. . . . General Motors' foreign sales last year were 284,281 units, 28.9 per cent ahead of 1934 and about equal to the 1928-29 levels . . . . Willys-Overland receivers have a court permission to build 15,000 more cars to keep the factory open pending reorganization. . . . General Motors will call its new Los Angeles assembly plant the Argonaut Mfg. Division. . . . Pontiac, Oldsmobile, and Buick cars will be assembled there for the Pacific Coast trade. . . . Chiefly due to adoption of the steel turret top, Fisher Body in 1935 increased its use of steel 132 per cent over 1929, although building only 96 per cent as many bodies. . . . Export orders booked by Studebaker in December were the largest for any month since May, 1929, presaging a good export year. . . . Ford places world production in 1935 at 1,335,865 units, 56 per cent over the 855,037 of 1934. In the United States and Canada, Ford 1935 output was 1,272,885 units, 77 per cent greater than the 715,438 of 1934.

WINDOWS OF WASHINGTON

WASHINGTON

JUST as the music goes round and round, so do legislative ideas go round and round, and last week congress was back to its old practice of baiting business.

On the floor of the house, Rep. Robert F. Rich, a Republican, from Woolrich, Pa., lashed into the proposed merger of various units of the Bethlehem Steel Corp. into one operating company.

Charging that the consolidation was aimed at defeating income tax laws and demanding stricter enforcement of antitrust laws, Representative Rich asked Attorney General Cummings to investigate.

So far as the tax angle is concerned, it is stated frankly by officials of Bethlehem that the changes in the income tax laws barring consolidated returns and levying a special tax on inter-company dividends are partially responsible for the new setup (STEEL, Jan. 20, p. 12), on which stockholders will vote Feb. 26.

Attacks Other Realignments

Representative Rich also hit out at the closer link between the Sharon Steel Hoop Co. and the Pittsburgh Steel Co., the recent acquisition of the Corrigan, McKinney Steel Co. by the Republic Steel Corp., which the department of justice tried to stop, and the rumored merger of Gulf States Steel Co. with Republic.

The representative provided the department of justice with a list of companies Bethlehem proposed taking over; this was not made public, but presumably includes subsidiaries whose corporate identities will be lost.

The clew to Representative Rich's outburst may be in mention of Bethlehem's attempt to take over the Williamsport Wire Rope Co. by "paying $700 for each $1000 bond." It happens that Williamsport is in Mr. Rich's district, and he was educated there.

In the department of justice routine, the complaint was turned over to the antitrust division, in charge of John M. Dickinson, former assistant secretary of commerce. Notwithstanding the fact that new dealers have lost all hope of any support from business in the presidential campaign, efforts have been made recently to minimize harassments.

But this was only one incident in a big week at Washington. The Supreme Court took another shot at AAA by demanding that $200,000,000 of impounded processing taxes be refunded immediately, congress passed the bonus bill and sent it to the White House, the President put his official approval on the word "boondoggling."

The biggest event of all did not directly concern business but it reflected the class consciousness which the new deal has imparted to organized labor.

Last week at D.A.R. Constitution Hall, within a stone's throw of the executive mansion, the Washington musicians union refused to go on with an opera unless it received cash before the opera started. It was offered a $1500 check endorsed by several of Washington's most prominent citizens. The union refused it and tried to stop the opera. It was no go.

Some 2000 diplomats, members of congress, and mere Washingtonians awaited the first strains of the opera "Lakme," which was supposed to have begun at 8 p.m. At 9:30 announcement was made that the musicians had struck and refused to play in spite of the practically certified check which had been placed in their hands.

There were hisses and catcalls, the police were called in, and all kinds of confusion resulted—even in the presence of two members of the Supreme Court of the United States.

The problem was finally solved by some dowager in the audience offering to play, on a small organ placed on the stage, the whole score from start to finish. The play ended about 2 a.m., having started at 10:30 p.m. amid hisses for the union and applause for the company which went through with it.

And still unemployed musicians ask help.

ROPER SIDETRACKING BERRY COUNCIL, PUSHING HIS OWN

Every effort is being made by various branches of the administration to kill the Berry council for industrial progress—not the least of which is being done under the direction of Secretary of Commerce Roper and his own business advisory council.

However, the secretary is on the spot—because he could stop the Berry movement in a moment—if he would. He is now entrusted with disbanding the NRA and its organization under an executice order of the President—and Major Berry's helpers are all on this payroll. However, that would be too crude.

Instead, Mr. Roper is keeping his own business advisory council as near the front pages as possible, and in that way is playing down the Berry organization. In fact, the new Roper council, recently set up for the year, is composed of some of the leading industrialists of the country, of whom Myron C. Taylor, chairman of the United States Steel Corp., is one.

Talking to his council at its recent meeting Mr. Roper said:

"The President though executive order has transferred to the department of commerce the divisions of the NRA with which business is primarily concerned. Under this executive order it is our responsibility to liquidate these units of

NRA, and in doing so to preserve for future reference and use all data and other assets which will be of use to business, to the congress and to the executive departments in the future study of the NRA principles and objectives.

"Our desire is to put this material into such shape as to make it readily available to the legislative and administrative units of the government. To this end we desire the council through its executive committee to make a study of the tentative report now available to make sure that our program for the proper handling of the 'assets' of the NRA shall be put into the most useful form for future reference and study. This is in line with our policy of securing the advice of business on these matters before they are finally determined."

It has been announced that the executive committee of the council will meet in New York, Feb. 5, to adopt a program for 1936, and that a full meeting of the council will be held here on Feb. 27, following which the council meetings will be held every sixty days in accordance with arrangements already made.

It was reported Friday that Major Berry might drop his council.

CLOSE NRA DISTRICT OFFICES JAN. 31; STUDIES IN DOUBT

Incidentally, the way is being cleared now for a final report on NRA to be made to the President not later than March 15. NRA is to be dissolved by congressional act as of April 1, unless other action is taken—which is not expected.

Secretary Roper, it has just been learned, has sent the so-called Roberts report on compliance to the President, and this will be considered a part of the report on NRA.

It still is a matter of conjecture here just what will be done with the industry studies being made by NRA officials, including the steel report.

There is talk in some quarters that several outstanding industries may be selected and their studies completed, while the others will just go by the board. If this is done, it will be in the interest of getting a few good reports, rather than a good many not done so well.

As of Jan. 31 all NRA district offices throughout the country will be closed, 500 more persons will be severed from the NRA payroll—leaving a net of some 500 to 600 still on the payroll. All of these, of course, will go on or before April 1.

STEEL MEN ESCAPE ORDEAL

It looks very much, as this is written, as though the senate has really closed down the Nye munitions investigation committee show which has been running on without end—apparently.

This is because Senator Nye made remarks about former President Wilson which were not to the liking of some of the members of the upper house of congress.

Senator Nye announced that among other witnesses he had wished to call and could not for lack of appropriations were Eugene C. Grace, president Bethlehem Steel Corp.; H. L. Frevert, president, Midvale Co.; B. F. Fairless, president, Carnegie-Illinois Steel Corp.; and D. Carson Adkerson, president, American Manganese Producers' association.

RAW MATERIAL PRODUCERS TO FIGHT TRADE AGREEMENTS

A committee has been organized here to initiate a so-called raw materials national council, whose sole purpose is to test the constitutionality of the reciprocal trade agreements.

J. Carson Adkerson, president of the American Manganese Producers' association, is serving as chairman of the organization committee. Former United States Senator Clarence C. Dill, of Washington, will serve as general counsel.

The committee points out that through reciprocal trade agreements, tariffs on American raw materials are being bartered away and advantages given to manufactured products.

$12,000,000 TO SURVEY EFFECTS OF MACHINERY

The machinery industry is considerably upset over a new survey being made by the government to ascertain how many people have been displaced by the use of improved machinery.

The works progress administration has announced the establishment of a national research program. As the major field agency for collecting information essential to the guidance of administrative policy and action, the program has been allotted $12,000,000 from which suballotments will be made to various phases of research work.

As part of this program, the first project has been set up to study the effects of recent changes in the techniques of production upon the volume of employment and unemployment, and this is what the machinery industry is concerned about.

RAYBURN WOULD TIGHTEN UP TRADE COMMISSION ACT

Rep. Sam Rayburn, chairman of the house committee on interstate and foreign commerce and generally considered an administration spokesman, has introduced a bill in the house to amend the federal trade commission act.

What is considered the most important change provided for in the bill is an amendment to section 5 of the act, which gives jurisdiction to the commission over unfair methods of competition.

Under the proposed amendment, that section of the act would read: "That unfair methods of competition *and deceptive acts and practices* in commerce are hereby declared unlawful."

With the one exception noted above, all of the other amendments relate to procedure. It is contended that none of the amendments would prejudice the rights of any person or corporation proceeded against, but that they will clarify the act, expedite the proceedings and avoid unnecessary expense.

TO REVIEW E. J. & E. CASE

The United States Supreme Court last week granted the government a review of a lower court's adverse decision in a suit to force the Elgin, Joliet & Eastern railroad owned by the United States Steel Corp., to suspend carrying of steel products in interstate commerce.

The government suit was filed under provisions of the interstate commerce commission law which makes unlawful the carrying by a railroad of any products in which the carrier has a direct or indirect interest.

FIGHT DELAY ON ROADS

Washington representatives of road builders are pretty much upset these days because of the recommendation made to congress by the President that the authorization of $125,000,000 for the fiscal year 1937 for road building be postponed until the fiscal year 1938 in view of work now being done.

It is contended here that this recommendation has been made so that the budget could be cut down as much as possible. The road builders, on the other hand, contend that they are all ready to go and will make every effort to have this move blocked. Of this amount, a large part would be used for the purchase of steel.

MARCH NOW HEADS FTC

Col. Charles H. March has succeeded Judge Ewin L. Davis as chairman of the federal trade commission. The chairmanship rotates each year under the trade commission act. This is the second time that Colonel March has been chairman. He has served since 1929 as a member of the commission.

Standard Is Reaffirmed

Division of simplified practice of the national bureau of standards, Washington, has announced that simplified practice recommendation R2-32, beds, (including metal ones), springs, and mattresses, has been reaffirmed without change by the standing committee of the industry.

Men of Industry

JAMES L. WICK JR., president and general manager, Falcon Bronze Co., Youngstown, O., has been nominated for president of the American Foundrymen's association, Chicago, for 1936-37, to succeed Dan M. Avey, editor, *The Foundry*, Cleveland, who is now serving his second term. Mr. Wick is vice president of the association and has been particularly interested in cost work.

H. Bornstein, chief chemist and metallurgist, Deere & Co., Moline, Ill., has been nominated for vice president.

James L. Wick Jr.

The following have been nominated for directors for three years: Marshall Post, vice president, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.; L. N. Shannon, vice president and production manager, Stockham Pipe & Fittings Co., Birmingham, Ala.; James R. Allan, assistant manager, industrial engineering and construction department, International Harvester Co., Chicago; C. C. Gibbs, president, National Malleable & Steel Castings Co., Cleveland; and Mr. Avey.

Officers will be elected at the annual convention of the A.F.A. in Detroit, May 4-9.

♦ ♦ ♦

P. J. McKimm, formerly metallurgical engineer in charge of steelworks operations at the Otis Steel Co., Cleveland, for the last four years, has been named chief metallurgist, succeeding H. C. Smith, who has resigned to go with the National Steel Corp., Detroit. Prior to his association with the Otis company five years ago, he was connected with the Wheeling Steel Corp., Youngstown Sheet & Tube Co., United Alloy Steel Co. and Central Steel Co.

In his new position he will be assisted by S. W. Whitelaw, who will continue as assistant chief engineer. Mr. McKimm will be succeeded at the steelworks by his brother Ralph.

♦ ♦ ♦

L. M. Graham has been named sales director of the Cooley Electric Furnace Co., Indianapolis.

♦ ♦ ♦

Theodore R. Pickering, former salesman, has been made sales manager for the Batavia, N. Y., plant of the Doehler Die Casting Co., Toledo, O. He succeeds the late Charles I. Hodgson.

♦ ♦ ♦

Gardner Smith, of Los Angeles, has been appointed sales representative of the Toledo Steel Products Co., Toledo, O., in southern California and Arizona. Mr. Smith will assist Jim Gay, long-time Toledo representative on the west coast.

♦ ♦ ♦

Theodore E. Palmer has recently been made assistant foundry superintendent, Gilbert-Barker Mfg. Co., West Springfield, Mass. Graduating from Wentworth institute, Boston, in 1918, he immediately entered the employ of the Brown & Sharpe Mfg. Co., Providence, R. I., remaining until 1922, when he was made foundry superintendent of the Wilcox, Crittenden Mfg. Co., Middletown, Conn. In 1923 he was made foundry superintendent for the Old Colony Foundry Co., East Bridgewater, Mass., and remained with that organization until his recent appointment.

♦ ♦ ♦

Charles F. Kettering, vice president in charge of research, General Motors Corp., Detroit, has been awarded the Washington award for 1936 "as an outstanding engineer who has rendered pre-eminent services in promoting the public welfare through his outstanding contributions to the increase of personal mobility and his driving force for the cause of research as an instrument to increase the welfare and happiness of all mankind." The award will be formally presented to Mr. Kettering at a dinner in Chicago Feb. 27.

Charles F. Kettering

The Washington award group is composed of representatives of the American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers, Western Society of Engineers, American Institute of Electrical Engineers, and American Society of Civil Engineers. Past winners of this award include Herbert Hoover in 1919, Robert W. Hunt in 1922, Arthur N. Talbot in 1923, Ralph Modjeska in 1930, and Ambrose Swasey in 1935.

♦ ♦ ♦

H. R. McMahon has retired as president of Standard Steel Spring Co., Coraopolis, Pa. Announcement of his successor is expected to be made within the next few weeks.

♦ ♦ ♦

S. D. Williams has been appointed director of sales of the Timken Steel & Tube Co., with headquarters in Canton, O. He has been connected

R. A. Donaldson

Appointed metallurgist of the Woodward Iron Co., Birmingham, Ala., as noted in STEEL for Jan. 6. He has been engaged in metallurgical and research work since 1921. He will be occupied principally in foundry consultant work

with the Timken organization since 1926, starting as metallurgical sales engineer, and being made manager of tube sales in 1935, after serving as assistant director of sales for several years. Mr. Williams has been active in the development of special steels to meet the needs of the trade.

♦ ♦ ♦

Lloyd J. Bohan has been added to the sales force in the Chicago area of the Michiana Products Corp., Michigan City, Ind. His headquarters will be at 80 East Jackson boulevard, Chicago.

♦ ♦ ♦

M. L. Frey, formerly metallurgist, of the John Deere Tractor Co., Waterloo, Iowa, for nearly 10 years, has resigned to become metallurgist with the Donner Steel Co., Buffalo, a subsidiary of Republic Steel Corp.

♦ ♦ ♦

James H. Duff has been transferred from the general sales force of Carnegie-Illinois Steel Corp., Pittsburgh, to the Cleveland office, and L. K. Whitcomb, of the Cleveland office, has been transferred to the Pittsburgh office in a sales capacity.

♦ ♦ ♦

W. R. Jennings has been made foundry supervisor, Deere & Co., Moline, Ill., and will be connected with the tractor plant at Waterloo, Iowa. He first entered the castings field as representative of the Pittsburgh Testing laboratory, stationed at the Industrial Works, Bay City, Mich. In 1919 he became superintendent of the Bay City Foundry & Machine Co., and in 1925 was appointed foundry manager of the Baker-Perkins Co. Inc., Saginaw, Mich. From 1930 to 1934 he was foundry manager of the Frank Foundries Corp., Moline, Ill., and from then until the present was foundry manager, Ecorse Foundry Co., Ecorse, Mich.

Charles R. Moffatt

Formerly director of advertising for the former Illinois Steel Co., who has been made advertising manager of Carnegie-Illinois Steel Corp., with headquarters in Pittsburgh, as reported in STEEL for Jan. 6

♦ ♦ ♦

H. L. Dalzell has joined the sales staff of the Par-Brook Mfg. Co., sheet metal fabricator, Cleveland. He formerly was connected with the Dalzell McClaskey Co., Youngstown, O., for ten years. Mr. Dalzell brings to his new position wide experience both in plant and field on all types of sheet metal and plate fabrication work.

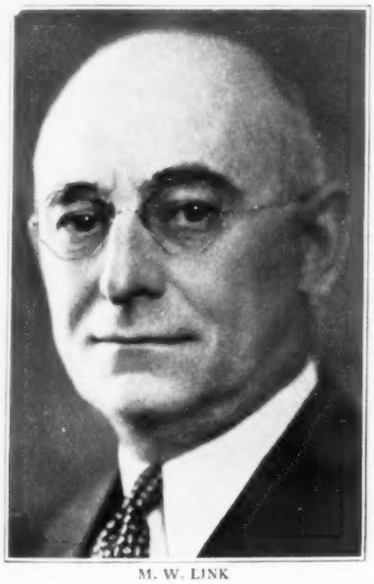
♦ ♦ ♦

Louis Jordan has been added to the staff of the American Institute of Mining and Metallurgical Engineers, New York. Effective Feb. 1 he will become secretary of the Institute of Metals division and secretary of the Iron and Steel division, two new positions set up by this institute. Mr. Jordan has had long experience as chief of section on thermal metallurgy and assistant chief of the division of metallurgy, national bureau of standards, Washington.

♦ ♦ ♦

Roy H. Norderer has been appointed manager of the metallurgical department, Lorain division, Johnstown, Pa., of the Carnegie-Illinois Steel Corp. In 1903 he was connected with the National Tube Co., Lorain, O., later going to Johnstown. In 1926 he was named metallurgist.

Prominent in New Division of Research and Development of Crane Co., Chicago



M. W. LINK

Named director of the research and development division of Crane Co. He started with the company in 1901 as assistant superintendent of the New York pipe fabricating shops; was transferred to the factory at Bridgeport, Conn., in 1904; later became chief draftsman and mechanical engineer there; in 1908 was transferred to the Chicago works; was promoted to sales engineer and manager of steam specialty sales; for five years has been chairman of the committee on products

B. A. PARKS

Made assistant director of the research and development division. Graduate of the University of Michigan in 1908, for three years he was erector, chief draftsman and assistant engineer for several companies. In 1911 he became associated with his father in Byron E. Parks & Son, consulting engineer. From 1929 to 1935 he carried on this business under his own name, specializing in industrial engineering, heating, ventilating, air conditioning and similar pursuits

A. M. HOUSER

Appointed engineer of standardization. He was employed by Crane Co. as laborer in 1896. Through study and hard work he obtained a position in the drafting department, from which he worked up to chief draftsman, mechanical expert, engineer of product, and manager of the engineering department. He has been especially active in standardization of piping details, valves and fittings, working with manufacturers' standardization society of the valve and fitting industry

Died:

HENRY BEDINGER RUST, chairman of the board of the Koppers Co., and for many years its president, at his home in Pittsburgh, Jan. 17.

Son of the late Col. Armistead T. M. Rust, he was born Dec. 13, 1872, on his father's farm, "Rockland," near Leesburg, Va.

He was educated in the country public schools of Virginia, and completed his education by private study. At 17 he went to Pittsburgh and secured a position as axeman on an engineer corps in the employ of the city.

At 21 he was made assistant city engineer in charge of laying out and completing many important projects.

At 28 he was made superintendent of construction for the Colorado Fuel & Iron Co. and had charge of the erection of the plant at Pueblo, Colo.

At 30 he returned to Pittsburgh as vice president and general manager of the Rust Boiler Co., which had been organized by his brother, Edwin G. Rust, with the support of H. C. and W. C. Fownes, for the manufacture and sale of water tube boilers under designs and patents of E. G. Rust. Five years later this business was sold to its largest competitor, the Babcock & Wilcox Co., with which H. B. Rust was associated during the following five years.

In 1914, with H. W. Croft and Hamilton Stewart, he developed a plan for the purchase of the H. Koppers Co., a comparatively small engineering and contracting company with headquarters in Chicago. This company was engaged in the designing and building of parts of by-product coke plants under patents of H. Koppers, of Essen, Germany.

With the co-operation and backing of Messrs A. W. and R. B. Mellon, this business was taken over the latter part of 1914, H. B. Rust was made president, and a few months later general offices were moved to Pittsburgh. It developed rapidly into the outstanding business in its particular field, which includes the designing and building of by-product coke, gas, tar and other industrial plants, mining and production of bituminous coal, manufacture and merchandising of coke, tar, gas and other coal by-products. It became one of the outstanding business successes of Pittsburgh during the last 25 years and one of the great engineering and manufacturing organizations of the country. Early in 1929 this company moved into its new 32-story office building.

In 1915 the H. Koppers Co. moved to Pittsburgh, bringing a total of 82 men. At the end of 1935, employes of the Koppers Co. and its subsidiary and affiliated interests totaled over 28,000.

In 1914 there arose a great demand for by-product coke because of the large savings that could be effected in competition with beehive coke. Mr. Rust foresaw this demand and gathered together an engineering organization competent to design and build plants to meet it.

The Koppers benzol plant design was originated and active construction undertaken in many steel plants where coke ovens were already in operation. For many months during the World war each month saw a new benzol plant go into operation.

In 1916 it seemed wise for the Koppers Co. to build and operate plants of its own, and Mr. Rust was

Henry Bedinger Rust

instrumental in this development. Two plants were built—the Seaboard By-Product Coke Co. at Kearny, N. J., supplying gas to the Public Service Corp. of Jersey City, and the Minnesota By-Product Coke Co. at St. Paul, supplying gas to St. Paul. The coke was largely marketed for domestic fuel.

A little later, when the Peoples Gas Light & Coke Co. in Chicago was financially embarrassed due to the condition of the gas industry, he organized the Chicago By-Product Coke Co. to finance, build and operate a large by-product plant. The success of this plant was largely instrumental in placing the Peoples company in much better financial condition.

Mr. Rust's progressive spirit was typified by his support of Joseph Becker's design of a new oven, since known as the Becker oven. At the time that the Koppers oven was at the peak of its popularity, he recognized the merit of the Becker oven and with his support this oven was developed.

Mr. Rust was a man of vision and great constructive ability. He had a remarkable understanding of human nature and a vital interest in his fellow men and their problems. He gave unstintingly of his time and strength in the interest of any employe or friend who needed help in time of trouble. In building his organization, two of the prime requisites were integrity and character.

Mr. Rust led an active business life and served on many Pittsburgh boards and committees handling civic matters. He was also a member of the American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, Engineers Society of Western Pennsylvania, American Gas association and American Iron and Steel institute. He was a member of the Duquesne club. He was a member of the board of Westinghouse Electric & Mfg. Co. for many years.

In recognition of Mr. Rust's achievements in the realm of business, Syracuse university conferred on him the honorary degree of doctor of engineering in 1930, and Oglethorpe university conferred the honorary degree of doctor of commercial science in 1934.

♦ ♦ ♦

H. E. Daniels, 62, railway supply executive, and head of the West Disinfecting Co., Chicago, in Evanston, Ill., Jan. 19.

♦ ♦ ♦

John E. Jambor, 53, president and treasurer, and Harry Pressinger, 54, secretary, of the Jambor Tool & Stamping Co., Milwaukee, in that city, Jan. 16.

♦ ♦ ♦

John C. Ferguson, 66, former president and general manager of the Eclipse Machine Co., Elmira, N. Y. and at his death president of the Eclipse Textile Devices Inc., an affiliate of the machine company, in Elmira, Jan. 7.

♦ ♦ ♦

Fred C. Deming, 67, manager of Carnegie-Illinois Steel Corp. sales in the Buffalo district for the past 23 years, in that city, Jan. 17.

Mr. Deming joined the Carnegie Steel Co. sales staff at Buffalo as a young man and upon the death of his chief, T. Guilford Smith, assumed the latter's duties which he held until the time of his death.

♦ ♦ ♦

Albert F. Shore, 59, inventor and prominent metallurgical engineer, New York, in that city, Jan. 17. Mr. Shore was president of the Shore Instrument & Mfg. Co., Jamaica, L. I., and had been a recipient of the Elliott-Cresson medal from the Franklin institute, Philadelphia. Of the many metallurgical testing instruments he invented, the best

(*Please turn to Page* 81)

Editorial

Federal Laws Force Industry To Change Corporate Setup

SEVERAL recent mergers in the iron, steel and metalworking industries serve to emphasize the powerful influence exerted by recent federal legislation pertaining to taxes and holding companies. The two largest organizations in the steel producing field have taken steps to simplify their corporate structures. A number of other producers and many concerns in general manufacturing likewise have revised their organizations or plan such action.

The two outstanding examples are furnished by the United States Steel Corp. and Bethlehem Steel Corp. It will be recalled that at the time the Carnegie Steel Co. and Illinois Steel Co. were brought together to form the Carnegie-Illinois Steel Corp., numerous smaller subsidiaries of United States Steel were merged into the new corporation. It was considered an important move toward "simplication" of the intricate structure of United States Steel.

New Income Tax Law Lays Heavy Burden Which Bethlehem Reorganizes to Avoid

More recently Bethlehem's directors approved a plan of merger to be submitted to a special meeting of stockholders to be held Feb. 26.. Under this plan the Bethlehem Steel Corp. of Delaware, Kalman Steel Corp., Bethlehem Mines Corp., Bethlehem Steel Corp. of New Jersey and the Union Iron Works Co. will be merged into one organization, Bethlehem Steel Corp., a Delaware corporation. In the view of Bethlehem directors, this is a start toward simplification. They indicated they will recommend further consolidations when desirable.

The purpose of the Bethlehem reorganization is set forth clearly and frankly in the announcement of the merger. Prior to 1934, the federal income taxes of a corporation owning subsidiaries were based upon consolidated net income. Amendments to the federal income tax law in 1934 require each corporation to file a separate income tax return and to pay taxes on the net taxable income therein reported.

With the return of the steel industry to profitable operations, this change in the tax law becomes extremely important. Under the old law, a corporation with subsidiaries was treated as a single enterprise. Losses in one branch of the business could be offset against profits in others. Under the amended law this no longer is possible.

Again, a further amendment, effective Jan. 1, 1936, provides that 10 per cent of the dividends received by a corporation from another corporation shall be included as taxable income of the former corporation. This means that today the corporation may be required to pay a tax of 15 per cent upon 10 per cent of the amount of the dividends received from subsidiaries.

Further Changes Likely in Move to Avoid Punitive Provisions of New Legislation

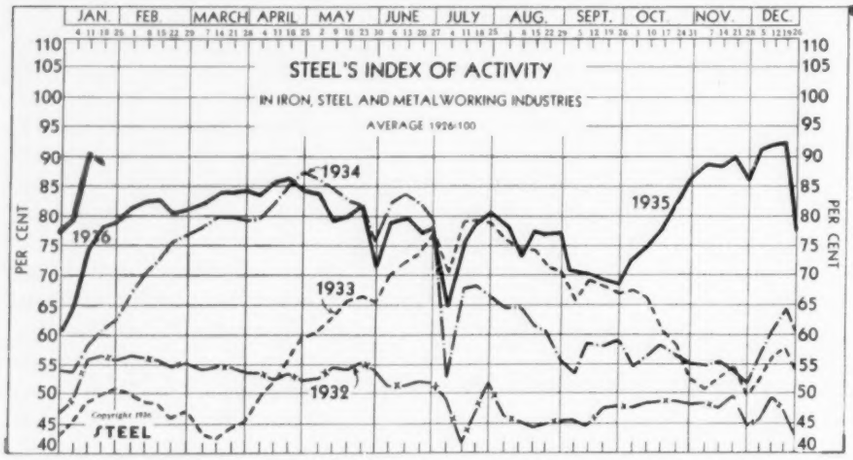
After reciting these changes in the tax laws, Bethlehem directors declared their belief that "in so far as practicable the physical properties of the subsidiary companies of the corporation should be acquired by it or otherwise consolidated in ownership and that the number of such subsidiary companies should be reduced." Savings in taxes and economies in management obviously are the dual objectives of this move.

Throughout industry many executives are watching closely the action of the larger corporations in order to better determine their own procedure. The pattern set up by the Bethlehem directors is particularly beneficial, first because it is sufficiently typical that it can be applied to many smaller but similar set-ups, and secondly, because the Bethlehem management stated so openly the factors entering into its problem and the details of its solution that its motives are clear-cut.

What industry is being forced to do to meet changes in federal tax laws is a forerunner of revisions which may be necessitated by other federal legislation. The social security act, the implications of which cannot be determined at this time, undoubtedly will call for numerous changes in the relations between industrial companies and their employes. Also, the question of constitutionality, which hangs over several laws now in effect, makes it more difficult for industrial executives to make definite decisions as to future policy.

It is quite apparent that the best insurance against the punitive or other provisions of new legislation affecting industry is reliable information and competent guidance. Many smaller companies cannot enjoy the facilities for investigation and legal counsel commanded by the large corporations. However, by scrutinizing the manner in which the latter act to meet problems which are common to all companies regardless of size, executives usually will find a pattern of action that will help them in determining the proper policy.

THE BUSINESS TREND



STEEL'S *index of activity in the iron, steel and metalworking industries declined 0.9 points to 89.3 in the week ending Jan. 18:*

Week ending	1935	1934	1933	1932
Nov. 16	88.8	55.2	52.6	49.2
Nov. 23	90.9	54.4	55.4	44.5
Nov. 30	86.0	51.9	49.7	45.3
Dec. 7	91.7	56.8	52.6	46.6
Dec. 14	91.8	60.6	56.0	49.3
Dec. 21	91.9	64.4	58.0	46.9
Dec. 28	77.3	60.8	53.7	42.9
	1936	1935	1934	1933
Jan. 4	78.2	65.4	53.6	45.3
Jan. 11	90.2†	73.8	58.1	48.6
Jan. 18	89.3*	78.1	60.9	49.3

†Revised. *Preliminary.

The index charted above is based upon freight car loadings, electric power output, automobile assemblies (estimated by Cram's Reports) and the steelworks operating rate (estimated by STEEL*). Average for 1926 equals 100, weighted as follows: Steel rate 40, and car loadings, power output and auto assemblies each 20.*

Industry Slowly Adjusting Stride to 1936 Requirements

INDUSTRIAL activity, as measured by STEEL'S index, declined slightly in the week ending Jan. 18 to 89.3. In the preceding week the index stood at 90.2.

The movement for January still is inconclusive. The very sharp upturn registered in the week ending Jan. 11 was due largely to the normal rebound from the holiday season. The slight recession of 0.9 in the current report represents a partial adjustment. Figures for several more weeks will be required before the trend of the new year becomes apparent.

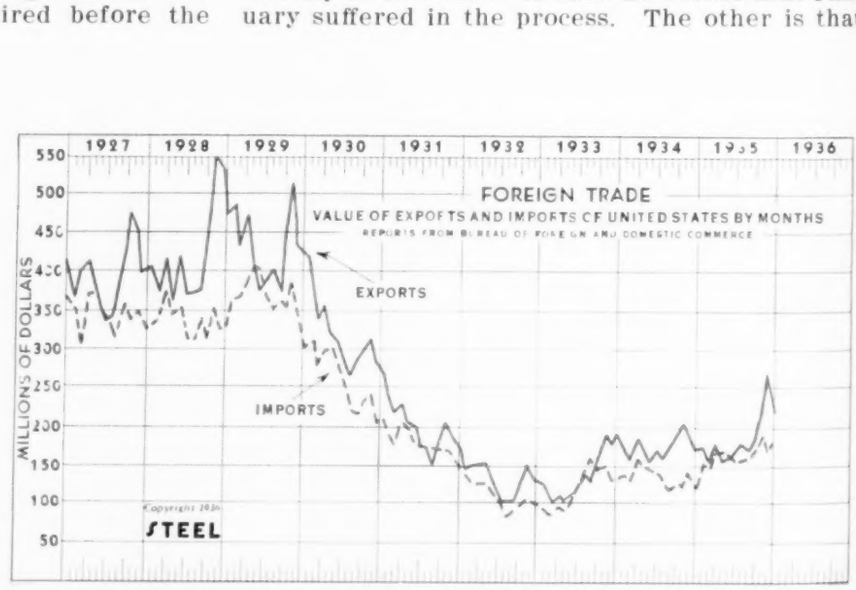
Steadiness was noted in the steel operating rate and in car loadings. Electric power output and automobile assemblies receded moderately.

In recent years, January has been a more active month for industry generally than December. Steel ingot output has been greater in January than in the preceding December in every year since 1921. It is almost certain that the precedent of 14 consecutive years will be broken when the production for January is tabulated.

Whether or not this break has any particular significance may be hard to determine. At first glance two partial explanations seem to suggest themselves. One is that the action of the automobile industry in advancing its annual show from 1936 into the late part of 1935 bolstered activity in December to such an extent that January suffered in the process. The other is that

Dollars (000 omitted)

	1935		1934	
	Exports	Imports	Exports	Imports
Jan.	176,223	166,993	169,531	128,536
Feb.	163,006	152,537	159,671	125,292
March	185,603	177,279	190,000	158,000
April	164,350	170,567	179,427	146,523
May	165,457	170,207	160,207	154,647
June	170,193	156,756	167,957	135,048
July	173,371	177,698	161,787	127,342
Aug.	172,194	169,030	171,965	119,516
Sept.	198,189	161,653	191,690	131,659
Oct.	221,215	189,240	203,622	137,859
Nov.	269,400	168,955	194,909	150,919
Dec.	223,737	186,648	170,676	132,252


1927 1928 1929 1930 1931 1932 1933 1934 1935 1936
FOREIGN TRADE
VALUE OF EXPORTS AND IMPORTS OF UNITED STATES BY MONTHS
REPORTS FROM BUREAU OF FOREIGN AND DOMESTIC COMMERCE
MILLIONS OF DOLLARS
EXPORTS
IMPORTS
STEEL

a series of price situations in the finished steel market served to sweep some business into December at the expense of January.

If these explanations hold water, then the changed relationship between December and January has little significance insofar as the medium-term trend of business is concerned. However, should subsequent events show that the failure in January to exceed December was the forerunner of a marked or extended slackening in pace of industrial activity, then it will be evident the episode was cause by some remote or intangible influence which thus far has escaped the notice of observers. As the year progresses it will be interesting to note how and to what extent increasing activity in the capital goods industries affects barometers of general business, such as car loadings, power output, etc. Road builders in their annual convention at Cleveland see $1,000,000,000 worth of work on the nation's highways this year. Similar renewed activity in heavy goods should tend to distribute benefits of recovery more evenly in 1936 than in any previous recovery year.

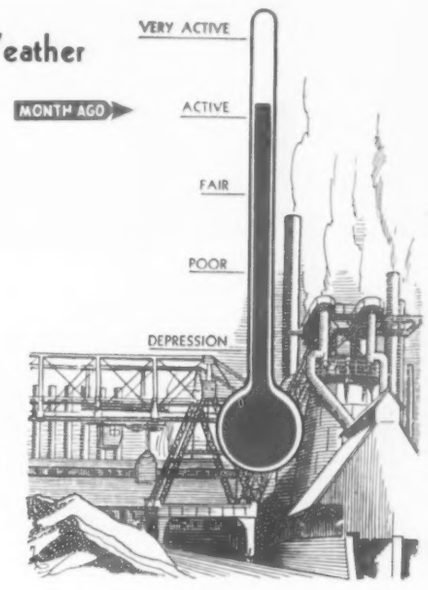
Meantime, car loadings at more than 600,000 weekly, power output at 1,950,000,000 kilowatt hours, automobile assemblies at 95,000 units per week and the steel rate at 52½ per cent indicate that the level of activity is higher today than in any January since 1930.

Where Business Stands

Monthly Averages, 1934—100

	Dec., 1935	Nov., 1935	Dec., 1934
Steel Ingot Output	151.7	149.3	95.6
Pig Iron Output	155.8	157.2	75.7
Freight Movement	97.9	107.3	88.8
Building Construction	.....	189.8	72.4
Automobile Output	145.0	170.6	77.1
Wholesale Prices	.....	112.1	102.3

Industrial Weather



TREND:

Steady

The Barometer of Business

Industrial Indicators

	Dec., 1935	Nov., 1935	Dec., 1934
Pig iron output (daily average, tons)	68,275	68,876	33,153
Machine tool index	99.9	93.8	54.1
Finished steel shipments	661,515	681,820	418,630
Ingot output (daily average, tons)	123,272	121,279	77,645
Dodge building awards in 37 states (sq. ft.)	.....	24,120,700	9,193,300
Automobile output	* 350,000	411,520	185,919
Coal output, tons	34,829,000	53,285,000	31,386,000
Business failures; number	.....	927	963
Business failures; liabilities	.....	$20,023,000	$19,910,610
Cement production, bbls.	.....	.....	4,447,000
Cotton consumption, bales	.....	507,836	414,000
Car loadings (weekly av.)	579,646	635,889	525,990

*Estimated.

Financial Indicators

	Dec., 1935	Nov., 1935	Dec., 1934
25 Industrial stocks	$191.96	$197.03	$141.31
25 Rail stocks	$31.98	$29.48	$28.99
40 Bonds	$83.52	$81.96	$81.75
Bank clearings (000 omitted)	.....	$20,777,653	$19,730,718
Commercial paper rate (New York, per cent)	¾	¾	1
*Commercial loans (000 omitted)	$8,249,000	$8,152,000	$7,653,000
Federal Reserve ratio, per cent	77.6	77.0	70.8
†Railroad earnings	$54,234,305	$75,425,092	$38,738,295
Stock sales, New York stock exchange	45,590,420	57,462,895	23,587,502
Bond sales, par value	$315,500,000	$301,977,000	$274,105,700

*Leading member banks Federal Reserve System.
†November, October and November, respectively.

Foreign Trade

	Dec., 1935	Nov., 1935	Dec., 1934
Exports	$223,737,000	$269,400,000	$170,654,000
Imports	$186,648,000	$168,955,000	$132,258,000
Gold exports	$170,000	$242,000	$140,000
Gold imports	$190,180,000	$210,810,000	$92,249,000

Commodity Prices

	Dec., 1935	Nov., 1935	Dec., 1934	Mo. av. 1913
STEEL's composite average of 25 iron and steel prices	$33.31	$32.17	$32.39	$26.32
Bradstreet's index	.....	$10.40	$9.49	$9.21
Wheat, cash (bushel)	$1.15	$1.09	$1.15	92c
Corn, cash (bushel)	79c	84c	$1.06	51c
Petroleum, crude (bbl.)	.....	98c	98c	$2.59

Economical Operation of Induction Furnaces

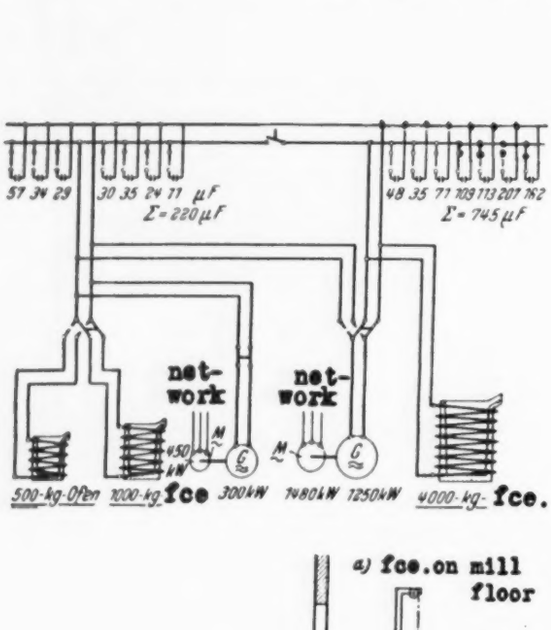


Fig. 1—Diagram of connections for installation of coreless induction furnaces

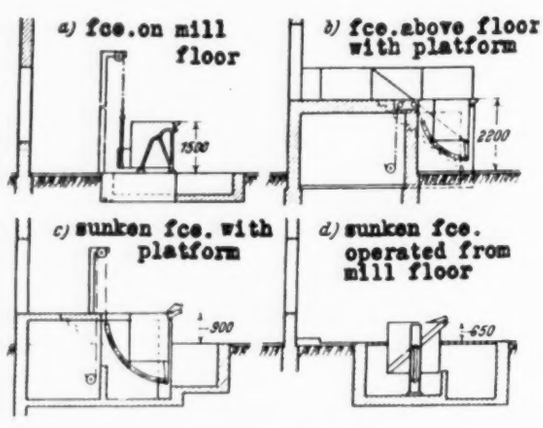


Fig. 2—Coreless induction furnaces of various constructions

BY FRANZ POLZGUTER
Bochum, Germany

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MANY papers, which deal in detail with the theory of the coreless induction furnace and its metallurgy, have appeared in the technical press in recent years. For this reason, it is intended in the present article* to shed light especially on the practical side of construction and operation of this type of steel melting furnace.

A report has been published on the experiences made in Bochum with a 600 and 1000-kilogram furnace[3]. These were entirely satisfactory and made it advisable to think of the installation of larger furnaces. For prevailing conditions, a furnace with a capacity of about 4000 kilograms came into question. First of all, it had to be decided whether or not it would be preferable, for a furnace of this size, to do without increased frequency and to connect the furnace directly with the 3-phase current network by means of a static transformer. In favor of this solution was the fact that it should be advisable with large furnaces, to work with frequencies which are not too high, as in this case, even when a rotating transformer is used, savings can be made in that a simpler machine can be constructed.

Detailed data in this respect have been given by W. Esmarch[3] in his study on the theory and practical application of the high-frequency furnace. When using network frequency it also would be possible to do entirely without the rotating transformer which operates with losses of at least 10 to 20 per cent, and to use instead a static transformer, where the losses are reduced to only 2 per cent. In so doing, the total efficiency of the furnace installation would be increased favorably from the outset. The disadvantages of a direct network connection would be mainly the following: poor adjustability of the output, unavoidable one-sided load on the network as the furnace—a 1-phase aggregate—must be connected with a rotary current network. To this the savings in part, because of the abolition of the transformer, are counterbalanced by an enlargement of the comparatively expensive condenser batteries.

It also must be borne in mind that the condensers for network frequency are considerably more expensive than those for high frequency; a practical

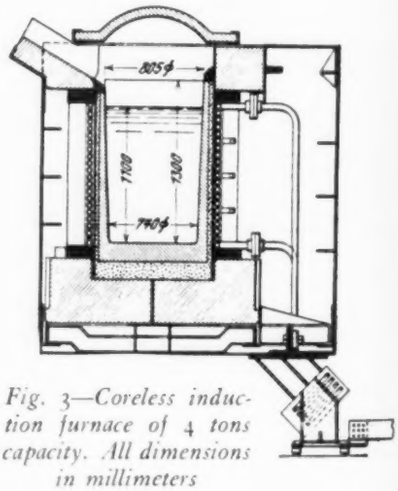


Fig. 3—Coreless induction furnace of 4 tons capacity. All dimensions in millimeters

*From *Stahl und Eisen*, vol. 55, 1935.

saving on the total installation, therefore, is out of the question. Experiments made with the smaller network furnace for steel melting have shown that difficulties are encountered in the melting down of solid charges so that the pronounced arching of the bath, due to the low frequency, entails additional difficulties.

On the basis of these considerations, it appeared advisable to use a frequency of 500 cycles also for the construction of the 4000-kilogram furnace. We had thus an opportunity of using the condensers already available for the large furnace; and in addition, to operate, if necessary, the old furnaces with the new machine. To attain the desired time of melting, which was to be two hours, including all secondary steps, a generator output of 1250 kilowatts was specified. Details of the electric characteristics are shown in the accompanying table.

Efficiency Is Higher

The driving motor is hooked up directly with the network of 5000 volts. It is remarkable that the comparatively favorable total efficiency of the transformer aggregate is 84 per cent as compared with about 76 per cent of the available older 300-kilowatt machine. As the efficiency is comparatively favorable even with smaller loads, the machine can be used occasionally for the operation of the smaller furnaces.

The transformer aggregate with direct coupled exciter machine is made of welded casings. The bearings are simple ring oiling bearings and provided with an alarm apparatus which is set in motion after a certain maximum temperature is exceeded. Simple oil condensers of about 6.5 μ. F, without special cooling devices, are used. The connecting and breaking is done by compressed air switches which are actuated by push buttons from a service board. A provision has been made

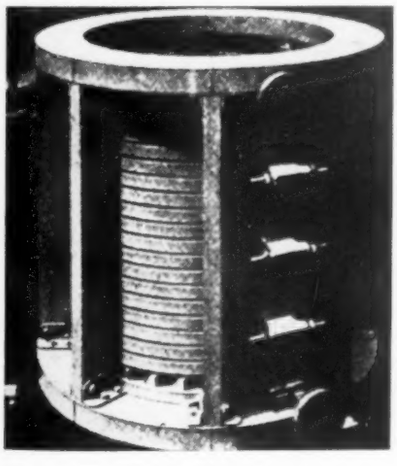


Fig. 4—Type of coil used for furnace of 4 tons capacity

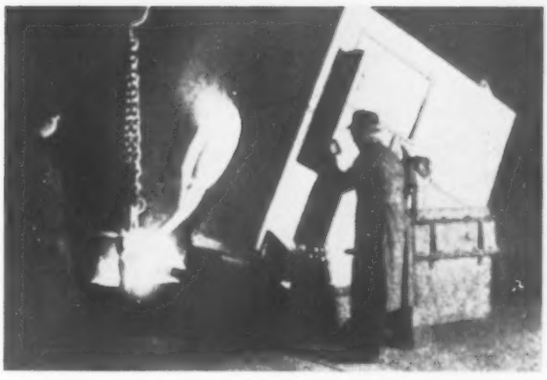


Fig. 6—Coreless induction furnace of 4 tons capacity in pouring position

to the effect that a condenser group cannot be switched off or on when the generator gives off current. In this manner, damage to the condensers by overloads is made impossible.

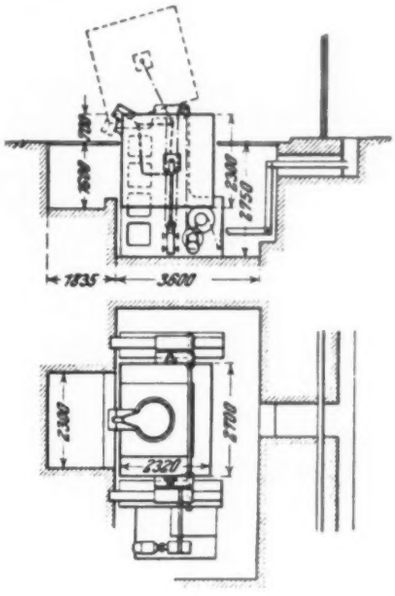


Fig. 5—Coreless induction furnace for 4000-kilogram charge

Fig. 1 shows the scheme of connections. We may see that it is possible by a simple switching, to operate the machine also for the small furnaces. Recently, connections have been developed which allow the simultaneous operation of two or several furnaces with a single generator. The melt, therefore, can be conducted so that a smaller current consumption of one furnace is coupled with a larger one of another other furnace.

Some general viewpoints as to the installation of 4000-kilogram furnaces follow. Fig. 2 indicates some possibilities hitherto used in the erection of coreless induction furnaces. The installation of the furnace above floor level is advisable only for small furnaces, otherwise, the bath cannot be seen during the course of the melt and charging is difficult. With larger furnaces, installed above floor level, a working platform can be provided as shown in Fig. 2b. With this arrangement, it is impossible, in view of the high level of the pouring spout above the shop floor, to cast the steel with the aid of small hand ladles. This drawback is eliminated by a partial arrangement of the furnace below mill floor and the simultaneous use of a working platform (Fig. 2c).

Unit Is Accessible

The arrangement of Fig. 2d insures small space requirements and accessibility from all sides without any obstacles in the form of superimposed tilting devices. The coil can be controlled at any time, even during operation. The charging, the control of the melting process, the sampling, etc, all are extraordinarily simple. Even with loose scrap, the time of charging is only about 10 to 15 minutes. With small scrap, application of a charging device is possible which reduces the time of charging to a few minutes. Casting steel by the aid of hand ladles, for small shaped castings, is particularly convenient. In this connection, it is an advantage that from the furnace itself, without the use of an intermediate pouring ladle, any number of partial tappings can be made. If the casting stage takes up too much time, the remaining steel can be reheated in simple manner, which is particularly important with thin-walled, shaped castings.

Fig. 3 gives construction details of the furnace having a capacity of 4000 kilograms. The furnace casing consists of an iron frame, well insulated at the edges which is rather far removed from the coil to avoid appreciable losses due to heating by the induced currents. Nonmagnetic steel was used only at the side of the pouring spout where it is unavoidable that iron parts come close to the coil. The coil itself is based on strong bricks. At the top, also, the coil is bordered by a course of wedged brick. The casing is provided with peep holes which enable a safe control of the coil even during the melt.

Fig. 3 also shows the introduction of the current by the aid of disconnecting knife switches. The switches

Efficiency of Equipment for High-Frequency Furnaces

Motor	High-frequency generator	Condensers	Load	Motor efficiency, per cent	Generator efficiency, per cent	Total efficiency, per cent
3-phase induction with squirrel cage rotor	1-phase	115 pieces	4/4	95.5	88	84.0
Rated output: 1400 kilowatts.....	1250-kilowatt	6.5 μF, output	3/4	95.0	87	82.5
Speed: 1000 revolutions per minute	2400-volt	745 μF, total	2/4	93.0	85	79.0
	Exciter direct connected	15,000 total reactance output	1/4	89.0	79	70.3

in relation to one another are blocked so as to make it impossible to tilt the furnace as long as the coil is under current.

Instead of a furnace frame being removed from the coil as far as possible, a copper screening could be used of the type applied to other furnaces. Another constructive type of coreless induction furnace has become known under the designation of Witton furnace[1]. In this unit, a laminated iron core is placed around the coil so as to prevent the straying of lines of force toward the outside. With this construction, it is entirely possible to use a narrow steel casing without incurring appreciable losses.

However, the manufacture of larger furnaces of this type appears to encounter difficulties. For one thing, the coil cannot be easily reached. A flash-over of the coil would lead to considerable damage. The most pronounced drawback of this construction appears to be the fact that with a break of the lining the furnace would be destroyed substantially. Up to the present, it has not become known that such furnaces have found acceptance to any extent.

Construction of the coil, for the 4000-kilogram furnace is shown in Fig. 4. It consists of 20 turns of a copper tube, wound so as to form a coil and having a rectangular cross section. Next to the current supply line are four inlets and outlets for water. The copper spiral is held together by sturdy Linex insulating rods. In this manner, a sufficient stability of the coil proper, and thus, of the entire furnace is insured. To avoid an excessive heating of the coil, a temperature recorder is installed at the water discharge side, which recorder actuates a warning signal, if a definite temperature is exceeded.

The 4000-kilogram furnace is tilted electrically with the aid of a driving motor of about 10 kilowatts, placed laterally. The motor through a suitable reduction gear and a main drive shaft actuates a drag chain arranged at both sides as indicated in Fig. 5. The chain, in turn, acts on a crosshead which moves up and down in a sliding guide and which actuates the push rod. The velocity of tipping can be regulated in four steps. It is adjusted to enable tapping the furnace within 1 to 1½ minutes. The control gear for the tilting mechanism is arranged at the side of the furnace; the attendant, therefore, is able to control most accurately the casting and to adjust the rate of casting according to requirements, which is particularly important when the tapping takes place into hand ladles. Casting steel into a pouring ladle is shown in Fig. 6. As with the smaller furnaces described in earlier papers, the center of rotation is located approximately in the plane of the pouring spout. The illus-

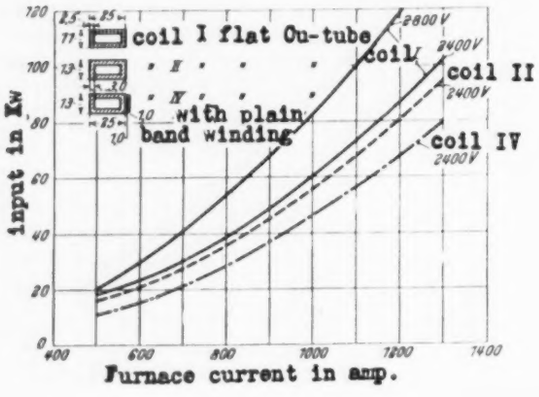


Fig. 7—Energy losses of various coils in coreless 1-ton furnace

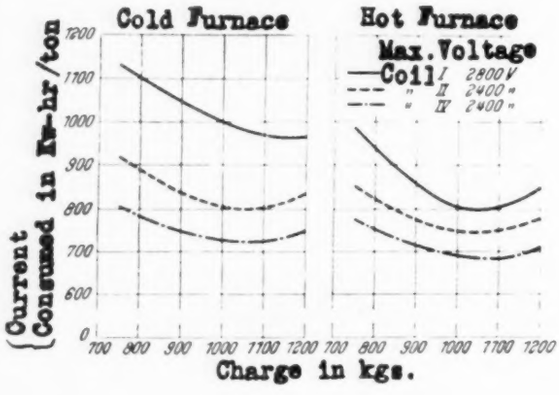


Fig. 8—Improvement of current consumption by modification of coils in 1-ton furnace

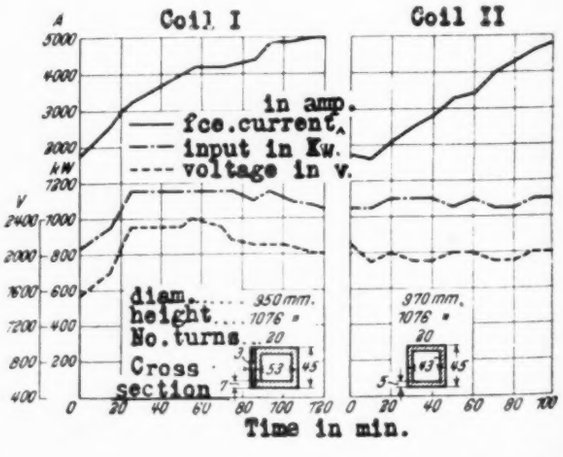


Fig. 9—Conditions with different types of coils when melting 3.6 tons high-speed steel

tration shows the construction of the steel casing with the lateral observation slides. In the approximate center of the furnace, may be discerned the place of application of the push rod arranged laterally.

With regard to the furnace lining, reference is made to earlier publications.[1] The old type of lining also was used for the new 4-ton furnace. The crucible is tamped into the furnace and backed with a filler layer of dry buffer material.[5] The life of the crucible varies from 30 to 50 heats, with acid lining (the only one used up to the present in the large furnace for reasons of safety) depending on the crucible material used and the steel to be made. Acid lining material used at Bochum consists chiefly of plastic refractory clay from the Palatinate with approximately the following composition:

Element	Per cent
Silica	89.0
Lime	0.5
Alumina	7.0
Magnesia	1.0
Ferric oxide (max.)	3.0

Part of the silica and alumina is present in the form of clay which serves as a bond for the material; however, the percentage of clay must not be too high, as otherwise, just as with molding sand, the crucible shows a pronounced shrinkage, tends to form cracks and does not dry properly. As a buffer layer, the same type of plastic refractory clay is used. At Bochum, the first heat usually is made of available mold waste and other gray iron scrap; the cast iron obtained readily can be used in the manufacture of pattern plates and molding boxes.

Another possibility of lining[6] the furnace involves the use of a steel template adapted to the shape of the crucible which template is melted down in the course of the first heat. With this method, it is possible to use as crucible material highly refractory monazite or quartzite sand which could hardly be tamped without bonding agent. Since the latter in most cases reduces the stability to heat of refractory linings, it is an advantage to do without it. The

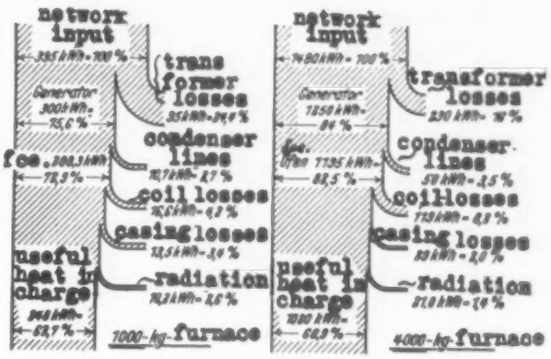


Fig. 12—Heat balance sheet of coreless induction furnace of 1000-kilogram and 4000 kilogram capacity

somewhat higher cost of a lining made with the aid of a steel template is compensated for by the possibility of reducing the time required for this work. Both of the methods described also can be used for basic linings. However, there is a higher

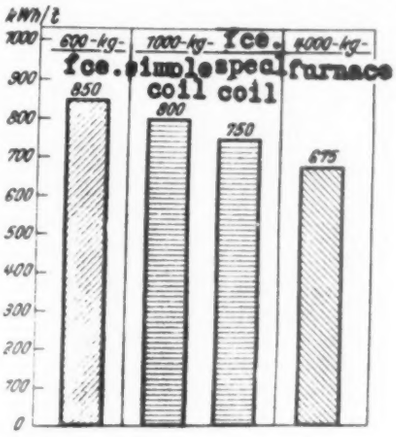


Fig. 11—Average current consumption in kilowatt hours per ton in 600, 1000 and 4000 kilogram furnaces

susceptibility of cracking shown by magnesite lining, and thus to the danger of a break-through of the crucible, than with acid linings.

The most important part of the furnace is the furnace coil. A correct construction of the coil does not only decisively influence the current consumption and thus the heat balance sheet of the furnace, but the operating safety of the plant as well. According to experience, the following general rules can be given:

Air-cooled coils have not been found satisfactory. In all cases, water-cooled coils should be used. A subdivision of the current junctions to obtain at all times a uniform energy absorption by the charge will be unnecessary, if the coils are adequately dimensioned, and if the condensers and the transformer aggregate allow a sufficient adjustment of the voltage. To obtain an input as constant as possible, the coils should be calculated so that with molten steel, at a voltage about 400 volts below the permissible maximum, the complete available output is absorbed. In view of the water cooling, the coil losses are relatively high; they increase with the current intensity of the furnace. At the same time, due to the well-known skin effect, only parts of the copper cross section of the coil can be utilized. By a special construction which is applied successfully, now and then, the useful cross section of the conductor can be enlarged; in this case, twisted flat copper metal bands, which are applied to the copper coil proper in insulated manner, are used. A comparison of the efficiency of various coils for the 1000-kilogram furnace, as given in Fig. 7, shows a certain superiority of such coils equipped with a flat copper band. It is understood that the superiority of such a coil with regard to the coil losses has a favorable effect on the current consumption, as indicated in Fig. 8 for the 1000-kilogram furnace. The same diagram gives a general idea of the importance of the construction of the coil.

Effect Was Unfavorable

Fig. 9 shows that with a high-speed melt with various coils in the 4-ton furnace, the twisted flat copper band, did not have a favorable effect. The flat copper band used for encasing, apparently was not sufficiently cooled. The graph shows that with this coil, at the beginning of the melt where a maximum energy absorption is desired, an only incomplete use of the machine can be obtained. In contrast with this, a coil of more recent construction,

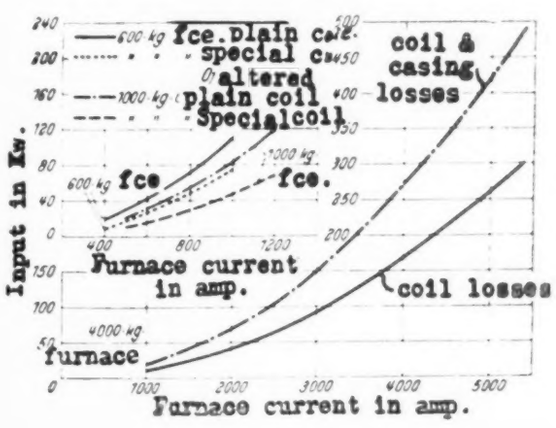


Fig. 10—Chart showing no load losses in coil and casing in kilowatts with coreless induction furnace of 600 and 4000 kilograms capacity

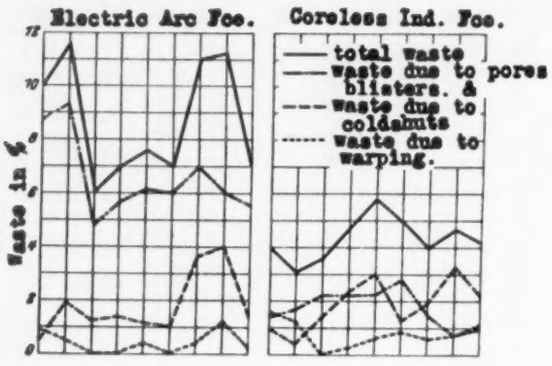


Fig. 13—Comparison of per cent waste in manufacture of cast magnets in electric arc and coreless induction furnaces

without special copper band, as shown in the diagram, proved to be considerably more favorable. The time of melt-down was reduced from 120 to 100 minutes. Whereas in coil 1, the average melting time, from charging until tapping, was 2½ hours, this time was reduced with coil 2, inclusive of all secondary steps, to an average of 2¼ hours. The input shows a remarkable constancy throughout the heat. The current consumption for the finished high-speed steel heat was only 560 kilowatt hours per ton.

Affords Quick Repair

This result is gratifying insofar as for reasons of operating safety the simple coil without any additional band must be given difference, at least for the time being. It is obvious that in the presence of a copper band, under the effect of the crucible expansion, the coil is more likely to suffer damage, than with a "bare" coil. Should there ever occur a flash-over on the coil, a plain coil can be repaired much more easily. Particular attention must be given in this connection to the necessity of dimensioning the new coil so that a uniform input is obtained if the charge is comparatively unfavorable. It is, therefore, largely independent of the "filling coefficient" (ratio of weight of scrap charged at beginning of heat to weight of a solid block completely filling crucible; Translator's Note).

As a measure of adequate dimensions of the coil and good adjustability of the entire current circuit, it may mention that the Bochum plant, the condensers need switching, during the melt, only about 6 to 10 times. Since during the switching, the current must be turned off, the total melting time is appreciably shortened. At any rate, it can be seen from the brief description of the coil that this important part requires greatest attention.

The coil and casing losses of the 4-ton furnace is shown in Fig. 10. The casing losses ascertained in the absence of a charge must be regarded as approximate only. When the furnace is charged, they are smaller, because the current takes the path of smallest resistance and for the most part is taken up by the charge itself. Only a small part reaches the casing which is at a greater distance from the coil. For the purpose of comparison, the coil losses of the 0.6-ton and 1-ton furnaces with various coils are given.

Average values of current consumption for the different furnaces are shown in Fig. 11. It may be seen that with increasing size of the furnace, just as with the other electric melting furnaces, the current requirements decrease. The data given represent the current consumed from the melt-down to the ultimate tap. They have been obtained under conditions of practice and with the use of the ordinary scrap at our disposal.

Heat balance sheets of the 4-ton and 1-ton furnaces are shown in Fig. 12. The total efficiency of the large furnace is 68.9 per cent, as against 62.7 per cent of the 1-ton furnace. The better efficiency is attributable primarily to the reduction of the transformer losses which amount to only 16 per cent with the 1250-kilowatt generator, as against 24.4 per cent of the older 300-kilowatt machine. The casing and leakage losses are also smaller with the large furnace, whereas at the present, the coil losses are still higher.

With regard to the metallurgical aspect of the problem, reference is made to earlier statements and to the large series of reports, especially published by the Kaiser-Wilhelm Institut fur Eisenforschung.[7] In Bochum, the furnaces are considered chiefly as electric crucible furnaces. Special metallurgical work such as fargoing dephosphorization, desulphurization, or decarburization etc. is out of the question, inasmuch as the furnaces operate almost exclusively with acid linings where such reaction occur either not at all or to a limited extent only. Now and then, a melt is carried on far enough to obtain a far-reaching deoxidation by a more or less considerable silicon pickup from the lining. Otherwise, the melts are conducted in the customary manner.

Losses Are Small

A particularly important fact is the small total loss due to burning and the small losses of the several alloying metals. In this respect, we can say that the large furnace attains or even improves the values given earlier for the 0.6 and 1-ton furnaces. For the main manufacturing line of the Bochum plant, i.e. shaped castings of all descriptions, the coreless induction furnace has become, to-day, an absolutely indispensable melting apparatus.

There is no other furnace in which small-shaped castings such as magnets, heat and corrosion resistant cast parts, cast tools, etc. can be made with the same close observation of analysis and a casting temperature so closely adapted to the size of the castings as is possible in the coreless induction furnace. To illustrate from practice. The melting shop at Bochum cast magnets from an electric arc furnace, for a prolonged period of time; the accruing waste may be seen from Fig. 13. The waste increased because of cold shuts, porosity, bubbles, and other casting defects; on the average, the percentage of waste was doubled.

This fact readily is understood, if we consider that in view of the tank-like vessel of the electric arc furnace, especially in the casting of the last portions of the steel, invariably in-

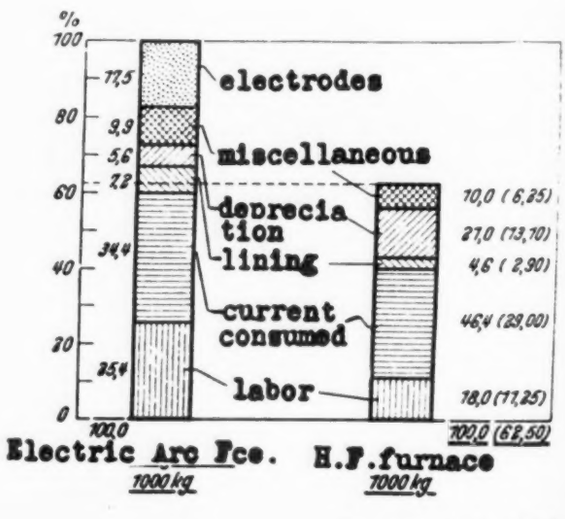


Fig. 14—Comparison of melting costs of electric arc and high-frequency furnace

conveniences are encountered. Toward the end of the casting, the steel readily changes. It cannot be reheated, because only a little steel is left in the furnace. If the metal is first cast into a large pouring ladle, and then into small hand ladles, similar trouble is encountered toward the end of the casting.

Meet Production Requirements

There is a widespread opinion that the coreless induction furnace is expensive. For this reason, a study has been made of the melting cost, extending over a prolonged period of time, of a 1-ton electric arc furnace and a coreless induction furnace of 1-ton capacity, both furnaces operating side by side. The result is shown in Fig. 14. When comparing the cost, the absolute values have been purposely omitted, since they differ with each plant. The comparison has been made on a cost basis of 100 per cent for the electric arc furnace. We then obtain a proportional cost of 62 per cent for a coreless induction furnace of the same size. Special difficulties as may arise when a coreless induction furnace first is installed at a plant, have been left out of consideration. The lower costs because of the elimination of the electrodes, a reduction of the expenses resulting from wages for melters; for, attendance is greatly simplified at the coreless induction furnace. The total costs for lining, also, are lower as there is eliminated the wear of the expensive furnace lid. Compared with these facts, the somewhat higher depreciation is no longer important, as required by the coreless induction furnace. Although the data given cannot be regarded as final, it is an established fact that the coreless induction furnace is economically entirely equivalent to an electric arc furnace of the same size. At any rate, the cost of producing more than 3500 tons of steel in the 4-ton furnace up to the present, compares favorably with the cost of operating the electric arc furnace.

In conclusion it is unquestionably possible to-day, to operate coreless induction furnaces of 4-ton capacity in a safe and economical manner. As an example, using a 1-ton furnace, it has been shown how different constructions of the coil influence the energy losses. A comparison of the heat balance sheet of the 4-ton furnace with that of the 1-ton furnace supplements the picture of the operation of the former.

Metallurgically, the furnaces have fully met the requirements with regard to the production of high-alloy steels. Their operation is particularly economical due to the small losses by burning. For the manufacture of high-quality shaped castings, a comparatively recent field of the alloy steel industry, this type furnace has become almost indispensable.

Pipelines buried 7 feet deep have been located by this magnetic detector

Locates Buried Pipelines

PIPES and other metal objects which have been buried and their exact locations and depths forgotten now can be found more easily with a magnetic detector developed by the General Electric Co., Schenectady, N. Y. Pipes laid more than 40 years ago have been located by this instrument. Other lines were discovered to be as far as 100 feet from their supposed locations, some of them at 7-foot depths.

The detector shown in the illustration is especially recommended for gas company and city engineers. It can be adjusted to a sensitivity 100 times that of the ordinary magnetic needle, making it suitable in locating metal objects at greater depths than heretofore and with greater accuracy. It is thought that the new instrument will find a place in magnetic investigations and the study of terrestrial magnetism.

Magnetic Susceptibility

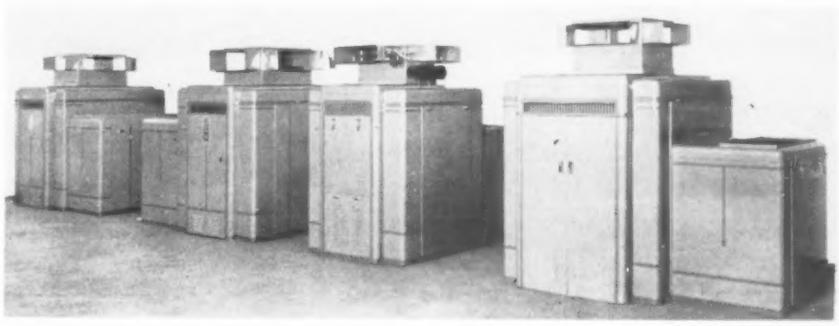
The instrument is a surveying compass with an adjustable bar magnet for reducing the control effects of the earth's magnetic field and making it more susceptible to a local magnetic pull.

The detector is sensitive to iron and steel pipelines having any magnetic bearing, and at a considerable distance. It may be used with or without electric current through the pipe, although establishment of a small current makes for easier and more certain search. Nonmagnetic pipe to be located, obviously, require an electric current. Due to its high sensitivity, the detector cannot be used near trolley lines.

Machine Parts Hard Faced

Wearing parts of automatic and semiautomatic machines offer many opportunities for hard facing. It has been found efficient and economical to protect in this manner lathe and grinder centers, cams, clutch fingers, trips, guards, keyways, and innumerable other wearing surfaces of these machines. In the case of controlling parts, such as strips and clutch fingers, more positive and immediate action is obtained after the piece has been surfaced with a nonferrous alloy.

Provide Conditioned Weather



HEAVY-GAGE, cold rolled furniture steel is used in four new type air-conditioners to be exhibited at the International Heating and Ventilating Exposition in Chicago this week by the Fox Furnace Co., Elyria, O. At the extreme left above is a unit equipped with a refrigerating machine for cooling and dehumidification. Alongside is a new oil-fired conditioner. Next in line is a gas-fired unit, and at the extreme right, a coal-fired conditioner. The gas-fired unit is finished in a two-tone green combination. It is equipped with "zone control," with temperature regulated by four thermostats

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Control of Electroplating

Part I

ELECTROPLATING is now an old and established trade which was nursed through the swaddling stage, dragged through adolescence, and finally beaten into an uncertain maturity by its harassed but devoted foster parents, the practical electroplaters. One must take his hat off to these pioneers and look upon them with admiration and sympathy, for certainly no foster parents were ever before saddled with a child afflicted with such obstinate whims, vagaries and downright cussedness.

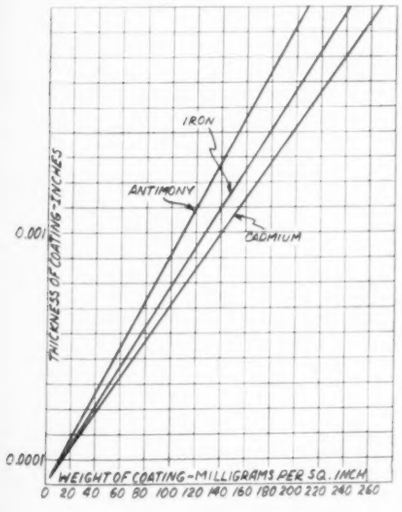
Small wonder that the old time plater was a master of invective, though it is to be suspected that many of them prayed devoutly as they threw a handful of "double nickel salts" or an indeterminate amount of "muriatic" into a plating bath that suddenly refused to function. As conscientious and hardworking as these men were, they knew little or nothing of the analysis of the baths they used or the real reason why the plate suddenly began to burn, become brittle or rough; neither did they know for certain just how heavy was the coating of electroplated metal they applied.

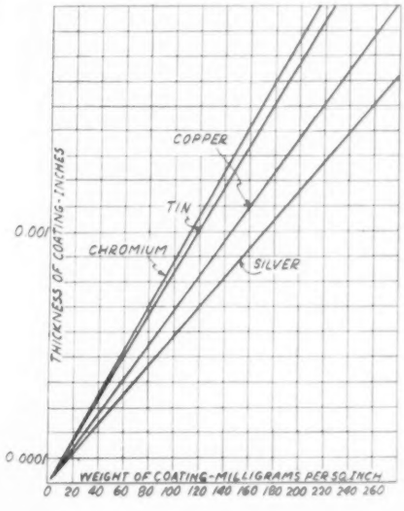
Consequently, plated ware began to fall into disrepute and it became evident to the more progressive element that chemical control would have to be established if the industry was to survive under modern standards of quality, uniformity and competition. Much progress has been made but the ultimate goal to complete chemical control in all electroplating establishments is yet to be realized.

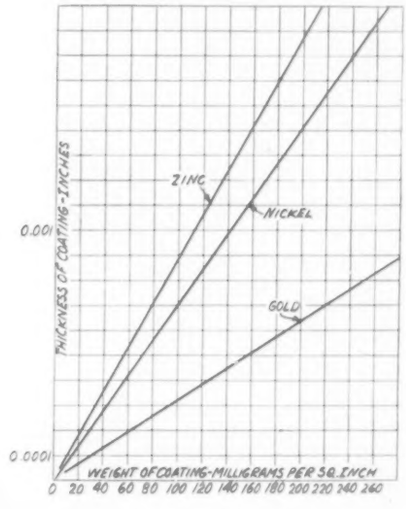
MANY manufacturers have their wares plated by outside jobbers and they are continually confronted with the problem of assuring themselves the specified weight of coating has been applied. The purchaser of plated ware is always uncomfortably conscious of the old adage "let the buyer beware," since a thin coating of highly polished plated metal has the same appearance as a heavy coat and a visual inspection will reveal nothing except in the case of an unusually thin and porous deposit. However, weight of coating is not the only factor in determining a good plate; the deposit must adhere well and be free from pinholes.

Since most of the tests for thickness of coating are not standardized and many are based on the time it takes for certain reagents to strip the plate, it is obvious many of them will give inaccurate if not erroneous results because the conditions under which they are applied will vary from time to time. The manufacturer who bases his estimate of a plate on an inaccurate test faces loss of reputation and sales. The sooner that he realizes he needs a competent chemist to supervise his plating room and check his products, the sooner he will achieve the goal of all modern manufacturers—control. However, it is obvious many small concerns cannot afford to hire a chemist, but they can and should consult a chemist to determine the best plating baths for their particular requirements, set up a routine testing program and arrange periodically to analyze the baths.

The tests which will be outlined by this discussion and succeeding installments have all been tried out and approved by one of the most critical laboratories in this country and while the reader may be familiar with some of them, others will be


IRON
ANTIMONY
CADMIUM
0.001
0.0001
THICKNESS OF COATING - INCHES
WEIGHT OF COATING - MILLIGRAMS PER SQ. INCH
0 20 40 60 80 100 120 140 160 180 200 220 240 260




ZINC
NICKEL
GOLD
0.001
0.0001
THICKNESS OF COATING - INCHES
WEIGHT OF COATING - MILLIGRAMS PER SQ. INCH
0 20 40 60 80 100 120 140 160 180 200 220 240 260

Three sets of curves showing relationships between thicknesses of electroplated coatings and weights in milligrams per square inch

new, even to chemists, since they have not, to the knowledge of this department, been published.

BEFORE going into these tests, it will be noted that weights of coating are expressed in terms of milligrams per square inch rather than in terms of thickness, and it is felt that the reason for this should be given. Electroplated coatings are extremely thin and are measured in terms of ten thousandths of an inch; because of the difficulty in measuring such small quantities, errors of from 100 to 200 per cent can creep in almost without detection.

Accordingly, it has been found that by specifying how much the coating shall weigh in milligrams per square inch (m.s.i.), a value of a sufficiently high numerical order to allow a close check upon variations in the plate is obtained. For instance, a coating of 50 m.s.i. of nickel is approximately 0.00027-inch thick; if the weight of this coating is to be checked by a thickness measurement it is obvious an error of 0.0001-inch is easy to make, and such an error is over a third of the thickness of the plate. On the other hand, an error of 0.0001-inch would amount to 18 m.s.i.

The tests to be outlined are all accurate to within a milligram, which means a control of thickness which cannot be measured by any thickness measuring instrument in ordinary use. It must be granted, however, that only average thickness over definite areas can be determined, but areas suspected of having thinner coats can be cut out and determinations run on them.

The relationship between weight of coating in m.s.i. and thickness in inches can be obtained by plotting a graph on ordinary cross section paper. The relationship is simple and by drawing a straight line between the points given in the following table, a set of curves such as those in illustrations on Page 37 can be obtained. By using these curves, manufacturers who have been in the habit of specifying their electroplated coatings in terms of thickness can determine them in terms of m.s.i. at a glance. Tabular comparison is as follows:

	Point No. 1		Point No. 2	
Metal	Thickness, inches	Weight, m. s. i.	Thickness, inches	Weight, m. s. i.
Antimony	0.0003	33	0.001	110
Cadmium	0.0003	28	0.001	141
Chromium	0.0003	32	0.001	113
Copper	0.0003	44	0.001	146
Gold	0.0003	94	0.0008	253
Iron	0.0003	38	0.001	128
Nickel	0.0003	44	0.001	143
Silver	0.0003	52	0.001	172
Tin	0.0003	36	0.001	120
Zinc	0.0003	34	0.001	113

SINCE this type of testing calls for precise technique and careful preparation of the solutions used, it is urgently recommended that, if the manufacturer does not have a chemist on his staff, he call one in to demonstrate the technique of the tests and prepare the solutions. If a chemist is not available or cannot be afforded, a druggist can do this work. Always have a chemist or druggist prepare the solutions, ready to use, since the accuracy of the tests depends largely upon them.

The tests to be described are all rapid considering the accuracy which is attained, and all of them can be performed by an intelligent employe who has been shown the mechanical procedure by a trained chemist.

The obvious question the reader will ask at this point is, "if a chemist must be called in, why outline methods like these when the chemist can use his own?" The answer is that the methods have been developed in private laboratories, some of them under the personal direction of the writer, and have not been published and made available to the chemical profession in general. These methods are specifically designed for the use of non-chemists, who have been "broken in" to use them; consequently to save much time, space and confusion, they are expressed in terms which any chemist or druggist can understand at a glance and can perform without difficulty. In many cases, they will be clearly understandable to anyone who has taken college chemistry or even a night course in chemistry.

Porosity Test

Solution

Make up a solution consisting of 100 grams per liter of sodium chloride and ten grams per liter of potassium ferricyanide. To 100 cubic centimeters of this solution add one liter of a solution consisting of 15 grams per liter of agar agar dissolved in tepid (not hot) water. The resulting solution will be yellow in color and may be used until it begins to turn green. Keep the solution in a dark place.

Process

Moisten a piece of filter paper in the solution described and apply it to the surface to be tested so that it lies in smooth contact over the entire surface. It is well to clean the surface with magnesium oxide and water prior to applying the prepared paper. Allow the paper to stand for 10 to 15 minutes and remove carefully so as not to tear. Blue spots will appear on the paper wherever there is an opening in the plate which extends through to the base metal.

This process was designed specifically for testing nickel over steel. Where the nickel has been applied over copper plate use the above solution with the addition of one gram per liter of potassium ferrocyanide. The procedure will be the same but red spots will appear instead of blue. The number of spots which are permissible is entirely a function of the quality of plate desired and the manufacturer can specify them in terms of the number per square inch.

This method also may be used to test a chromium plate for porosity but the test may show more pores than actually exist in the original plate, as the chromium will be attacked to some extent by the solution. It will be noted when this test is used that there will be an excessive number of blue or red spots at the edges of the treated paper and it is recommended that all spots within a ¼-inch of the edges be disregarded in evaluating the quality of the plate. These spots are due largely to the action of the air in conjunction with the solution which will attack the plate excessively.

(To Be Continued)

Obtains Sales Rights for Marking Paint

A. M. Castle & Co., Chicago, have acquired the sales rights to Markal, a new paint in stick form, developed by Helmer & Staley, Chicago, and described on pages 49-50 of STEEL of Dec. 23. The new paint is available in two grades, both carried in the pocket like pencils. One grade is for cold marking and may be used on materials up to 350 degrees Fahr. The other is for hot marking and may be used on materials ranging between 250 and 1200 degrees Fahr. In either case the paint dries and remains permanent. Markal for cold marking is used on structural steel, steel sheets, nonferrous metals, glass and many other products. Markal for hot marking is used in steel mills on hot shapes, billets and other products and in many other ways. It will not run up to 1200 degrees Fahr.

Will Manufacture Resin for Petroleum Resisting Paint

International Paint Co. Inc., 21 West street, New York, is about to build special equipment at its plant at Union, N. J., for the production of a synthetic resin, developed abroad, which is used in the manufacture of its petroleum resisting paint known as Tanctectol. This paint is for application to oil storage tanks, refinery equipment, oil immersed electric transformers, interiors of tank wagons, gasoline drums and railroad tank cars and other units which contact petroleum and derivatives.

Reflection of Future Trends Seen in Expanding Uses of Nickel Alloys

DURING 1935 applications of nickel and its alloys in manufacturing and fabrication increased so rapidly that the year's business in nickel was one of the largest in the history of the industry. The extent and underlying causes of this increase and possible future trends are discussed by Robert C. Stanley, president of the International Nickel Co. of Canada Ltd., Copper Cliff, Ont., in a 35-page pamphlet entitled The Nickel Industry in 1935, from which the accompanying article is abstracted.

WORLD consumption of nickel in all forms during the first ten months of 1935 amounted to 133,300,000 pounds. This compares with 112,481,600 pounds in the first ten months of the previous peak year, 1929, and with 102,780,000 and 77,600,000 pounds, respectively, in the similar periods of 1934 and 1933.

As a basic material, nickel has been among the first commodities to feel the impulse of returning industrial activity. Reports from all centers indicate a general restocking of bins and replacing of obsolete equipment. Of wide significance is the general trend noticed in the various fields of industry to specify better grades of materials in the machinery and equipment now being ordered for replacement purposes. It would seem that business as a whole is turning from a psychology of *laissez-faire* to a policy of forward planning.

Corrosion Serious Problem

At the same time the recognition of corrosion as a serious industrial problem is definitely broadening. The ability of metallurgists to provide not only ferrous alloys with high resistance to rust and corrosion but also nonferrous alloys with high strength and other physical properties, is making possible a new day particularly in the chemical and food processing industries. Better knowledge of plating, perfection of the processes for cladding steel with pure nickel, Inconel or stainless steel, and the substantial increase in the physical properties of these products are stimulating profound changes in industrial design and creating new potentialities for many lines of production.

Stainless steels are a substantial factor in this situation, as well as contributing new concepts to transportation design. In this latter case reduction in deadweight of rolling stock is of prime importance to the carriers. By eliminating the problem of deterioration through rust, the stainless steels can be used in thinner and lighter sections than could the materials previously standard for car construction. This reduction in mass weight makes for quicker starting and stopping of carrier units as well as for lower power consumption in haulage.

Progress made by stainless steels during recent years when most steel production was seriously curtailed inspires confidence in the future of these alloys which, by the way, now constitute the second largest outlet for nickel in Great Britain.

Two other classes of alloy steels have been utilized for supplementary applications in the field of weight saving. Experiments with low-alloy high-tensile steels led to the development of intermediate alloys in which nickel and copper (with or without additions) are essential elements. The other class is that of the low-cost nickel-manganese cast steels which found use for light section side frames, bolsters and other car castings and which are being adopted also by manufacturers of tractors and power shovels.

Alloy Cast Irons

Of equal significance from the point of view of the nickel industry is the growing interest in alloy cast irons. Now that foundries have taken a leaf from the alloy notebook, common gray iron is being produced with physical properties which give alloyed cast iron a strongly competitive position. As a result, the consumption of nickel for alloy cast iron is increasing rapidly and indicates the growing acceptance by the engineering profession of the fact that cast iron, when it is properly alloyed, becomes strengthened, stiffened, toughened, hardened and more generally suited for its work.

Among the nonferrous alloys, Monel metal has further strengthened its traditional position by the development of the "K" and "S" series.

Among the bronzes of the struc-

tural grades there has been a definite trend toward the use of nickel with tin to improve mechanical properties and to lower production costs. The practice is also expanding of making small nickel additions to high lead bronzes to prevent segregation, or "lead sweat," and to improve resistance to compression.

The attractive features of nickel-bearing aluminum alloys are gaining greater recognition, the principal applications today being pressure die castings, aircraft pistons, cylinder heads and automotive pistons. Such alloys have excellent casting qualities and good surface finish and machinability. A light aluminum alloy containing nickel has been developed recently by the Aluminum Co. of America. The coefficient of expansion of this alloy is less than that of unalloyed aluminum, consequently pistons made from it can be fitted more closely to cast iron cylinders.

Nickel Steel Welding Rods

To the expanding interest in welding a method for both structural work and fabrication of equipment, the nickel industry has contributed several improved materials. Nickel steel welding rods have been developed for welding high strength plates. The Monel metal electric welding rod is now coated in a special extrusion machine, and "K" monel has been electrically welded with excellent results through the use of a flux coated electrode.

As has been pointed out in recent issues of STEEL, 1935 showed a decided improvement in steel consumption; this brought a corresponding increase in the demand for nickel in the steel industry.

Whereas originally the use of alloy steels was largely confined to automotive, aeronautical and transportation fields, great strides recently have been made in the use of these alloys by industry at large. Pressing constantly for more compact and efficient design and improved performance, combined with relative freedom from breakdown, manufacturers of all types of equipment are more and more turning to alloy steels for the solution of their problems. Recent progress in this direction has been marked in the petroleum industry (both drilling and refining), the machine tool and hand tool industries, and the agricultural and textile industries.

This broadening of the base for nickel alloy steels in industry at large is reflected in the extent to which they are now being stocked by warehouses serving the larger industrial centers.

Practical methods for the control of the hardening properties of steel (so-called grain size control) were further improved, and stimulated interest in the lower cost members of the nickel alloy steel series. On both sides of the Atlantic the nickel steels retained their relative positions in the automotive industry and participated in its substantial gain over 1934. Nickel steels are entering more largely into diesel engine design where they are being used extensively for moving parts.

Among the industries already committed to alloy cast irons the automotive continued this year as the largest single consumer. Recent progress in brake drums has revealed a decided trend to cast iron, and there is a growing acceptance of nickel alloyed compositions. A similar future appears likely for camshafts, some which now are made in a high-test wear-resisting composition ready to serve "as cast". Certain manufacturers of large diesel engines are now using alloy iron crankshafts, and further progress is in prospect for crankshafts alloyed to possess high strength, toughness and hardness, and ready for service without need for heat treating and straightening processes.

Renewal of agricultural purchasing power has revived the implement business. Although dormant for several years, this industry has been actively engaged in studying materials. As a result, alloy cast iron is being used for gears, frames and other high-strength and wear-resisting parts.

The nickel-silver alloys, which trace their ancestry to ancient Chinese Paktong, have been subjected to further investigation. Studies have been completed which permit an intelligent selection of cast nickel-silvers to match the wrought products of nickel-silver and stainless steel.

The development of Monel metal, Inconel and the nickel-silvers and bronzes for special applications in construction and manufacture has stimulated the use of rolled nickel products. Nickel-clad steel is now employed for heavy equipment where both corrosion resistance and cost of fabrication are controlling factors.

The radio industry continues as a large market for rolled nickel, and development of the all-steel radio tube is increasing this use.

Progress has continued in the development of welding of nickel and nickel alloys and in their application in welded structures. Improvements have been made in welding technique and in the coated weld rods available.

Diversified Uses of Nickel

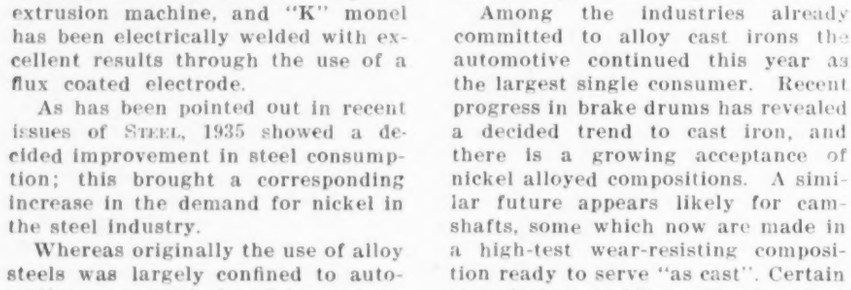
Nickel steels with 2 to 3 per cent nickel continue to be applied in welded pressure vessels for low-temperature dewaxing operations in the oil industry. Shot welding of chrome-nickel stainless steel continues in the construction of light weight, streamlined railroad equipment. Steel welding rods containing nickel are being utilized in welding high-strength steels in ship construction.

Applications of nickel in various forms have spread into the diversified fields which today constitute world industry. Whereas, for example, depression or prosperity among the makers of agricultural machinery used to have no effect on nickel, this particular industry is now a market for nickel alloy steels and cast irons. The broadening base of participation in industry at large has definitely become just as important a factor in nickel consumption as the increased rate of activity in such fields as automotive and food handling, where nickel and nickel alloys long have been etsablished.

The nickel industry participated in developments in the railroad field,

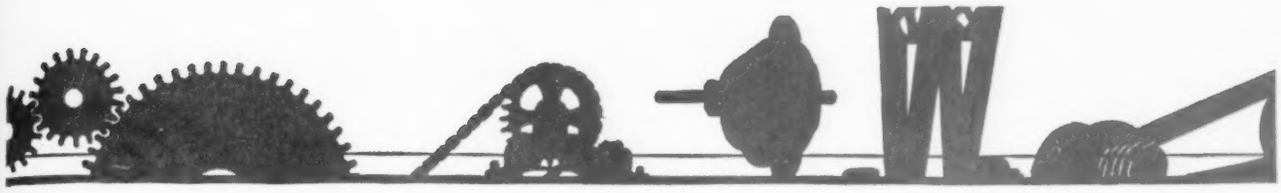
(Please turn to Page 62)

Truck Body of Stainless Steel



STAINLESS steel is now being used for the fabrication of sludge truck bodies used in the oil industry. This illustration shows one of two trucks recently acquired by the Shell Petroleum Corp. for hauling sulphuric acid sludge resulting from gasoline and oil refining operations. Not only does the stainless steel resist the corrosive action of the sludge, but its high strength permits a reduction in the weight of the truck with consequent increase in carrying capacity. The truck bodies were fabricated by Gar Wood Industries Inc., Detroit, and are mounted on Fruehauf trailers

Power Drives



Portable Tools

PORTABLE tools comprise mainly three parts: The lead wire or cable, the case, and the enclosed drive. The case, barring breakage, lasts indefinitely. Portable tool equipment is commonly designed for extremely light service, which generally has no place in production work.

Sometimes, however, the light-duty equipment gets into a plant. In one case a cost analysis of such equipment indicated that it required overhauling several times per year at a total maintenance and repair expense of approximately twice the original cost of the equipment. Changing to a type of portable tool more suitable for the service reduced the overhauling to about three times in two years with a considerably longer total life of the tools. Although the newer tools cost about twice as much as the original units the decreased maintenance expense alone paid the full cost of the new equipment in a few months over a year.

A similar investigation of the cable indicated a low-cost type in use which lasted only a few months. A higher grade cable, costing about three times as much, paid for itself almost twice within a year and was still good for a year or more of service.

Whenever anything has to be repaired or replaced, frequently it is possible to find something better and more economical.

• • •

Group Drive Economy

EVEN though group drive is the most economical method of installation for production equipment suitable for such drives it is poor policy to attempt to skimp on the cost of such an installation. To do so may put the drive at a serious disadvantage in maintenance costs.

Antifriction bearings will pay quickly for their extra cost in decreased power consumption and lubrication and maintenance expenses, and by all means are an important item of economy and operating satisfaction. After the savings have repaid the extra first cost the advantage in reduced expenses will be a continued source of profit and satisfaction as long as the shafts are kept in alignment and bearings are serviced regularly.

Clutches, where necessary on a line-shaft, should be of the best type obtainable for the service. Anything else may soon increase the annual operating expense, because of idle time and maintenance, much more than was saved on the original installation, and, in addition, make an unsatisfactory drive.

A few years ago, for example, a plant manager in an effort to maintain installation costs within a poorly prepared estimate decided, over the protests of the sales engineer, to use an old type clutch, which was still carried in the manufacturer's catalog, even though it had been designed for low-speed operation. Incidentally both the salesman and his company would have been better off had they emphasized more positively that such equipment would not operate satisfactorily under the conditions.

The installation was made, however, and, as might be expected, caused trouble within a short time as the shafts were operated at much higher speed than the clutches were designed for. A demand for adjustment was refused and business relations severed. Thoroughly disgusted with the entire installation, even though the trouble was due to his own poor judgment, the manager changed to unit drive, thus more than doubling the investment in drive as well as the corresponding fixed charges to be paid for out of profits.

Clutches and bearings are poor places to attempt economies on either group or individual drives.

• • •

Safety Links

FUSES, overhead relays, circuit breakers and similar devices are merely safety elements designed to fail, or operate, under pre-determined conditions of overload and thereby protect more valuable equipment. Continued or repeated operation indicates either that they are rated too low or, more generally, that an overload has been built up by faulty equipment or by an increased load due to changes in production. The remedy is obvious, after the conditions are investigated thoroughly.

A belt drive is a safety link in that with an exceptionally high overload it slips or runs off the pulley and so protects the motor or machine. However, relying on the belt for a safety fuse is expensive as the belt is often burned or damaged thereby.

For chain drives subjected to sudden stoppage the chain manufacturer supplies breaking pins and a special breaking pin hub in the gear. In these (See *Power Drives*, Jan. 13, p. 38) the gear is not keyed to the shaft but is held by a pin to a special hub which is keyed to the shaft. This pin is weakened by turning a groove in it in the section between the gear and hub. This part of the pin is strong enough to transmit normal overloads but will shear with excessive overloads leaving the gear free to revolve on the shaft and thus release the chain from the overload.

Any damage, therefore, is confined to an inexpensive and easily replaceable pin. The danger lies, however, in forgetting that a broken pin is a cause for thankfulness instead of a nuisance. In altogether too many cases the weakened pin is replaced with one of full strength which may not shear quickly enough to prevent damage to more expensive parts of the machine or drive. Such a policy is as foolish as is replacing fuses with pennies or nails to prevent their service of safety for which they are intended.

• • •

Greases containing soap, fiber and other fillers should not be used for lubricating worm gear speed reducers at any time. Such lubricants are especially ineffecient in cold weather.

• • •

In selecting a lubricant for gears and speed reducers consider: Type of reducer, speed, heat generated by operation, as well as the maximum and minimum surrounding temperatures.

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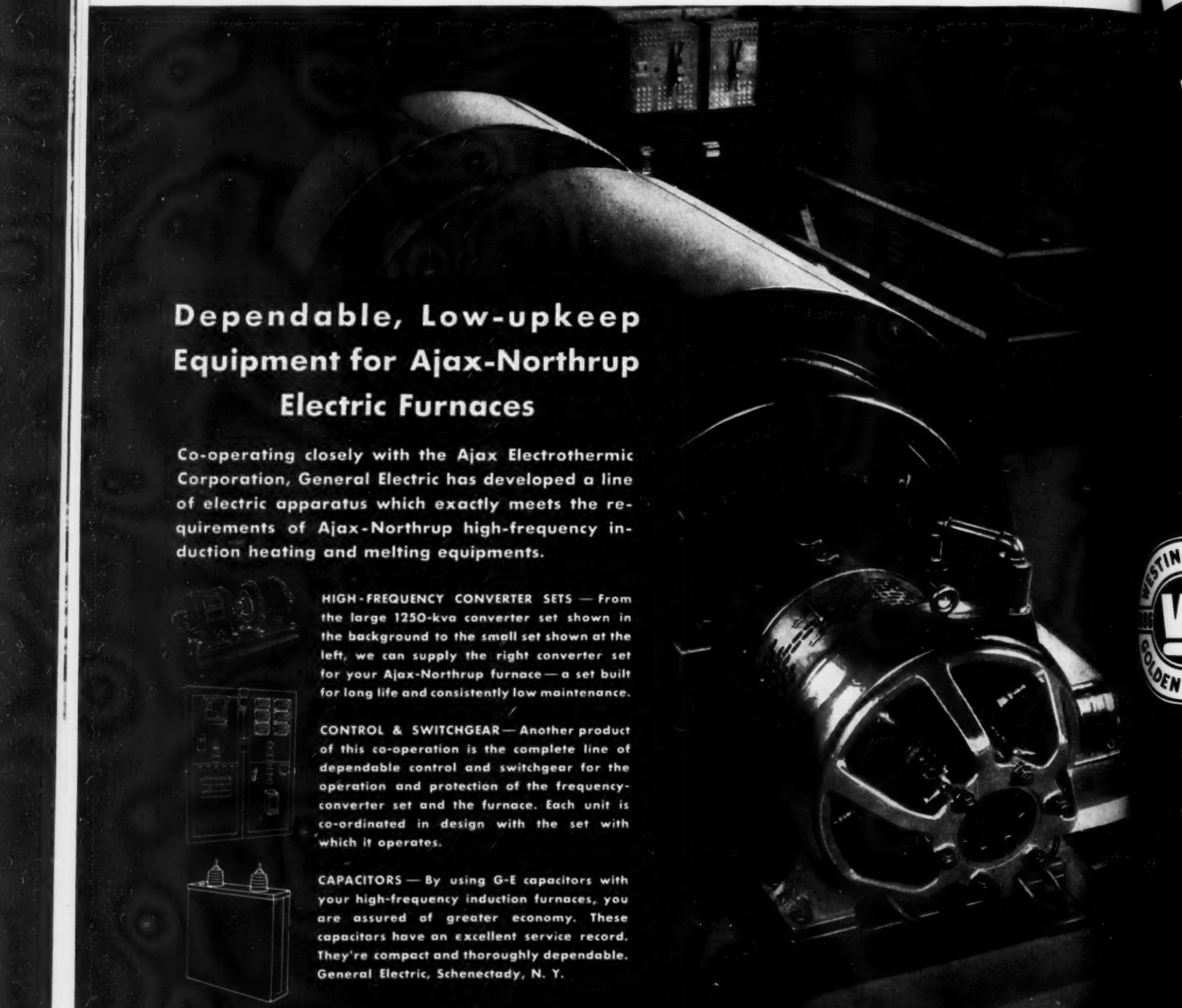
Variable-speed drives on machines engaged in producing a wide variety of work often pay for themselves within a year.

WHAT G-E CO-OPERATION WITH AJAX MEANS TO YOU



Dependable, Low-upkeep Equipment for Ajax-Northrup Electric Furnaces

Co-operating closely with the Ajax Electrothermic Corporation, General Electric has developed a line of electric apparatus which exactly meets the requirements of Ajax-Northrup high-frequency induction heating and melting equipments.

HIGH-FREQUENCY CONVERTER SETS — From the large 1250-kva converter set shown in the background to the small set shown at the left, we can supply the right converter set for your Ajax-Northrup furnace — a set built for long life and consistently low maintenance.

CONTROL & SWITCHGEAR — Another product of this co-operation is the complete line of dependable control and switchgear for the operation and protection of the frequency-converter set and the furnace. Each unit is co-ordinated in design with the set with which it operates.

CAPACITORS — By using G-E capacitors with your high-frequency induction furnaces, you are assured of greater economy. These capacitors have an excellent service record. They're compact and thoroughly dependable. General Electric, Schenectady, N. Y.

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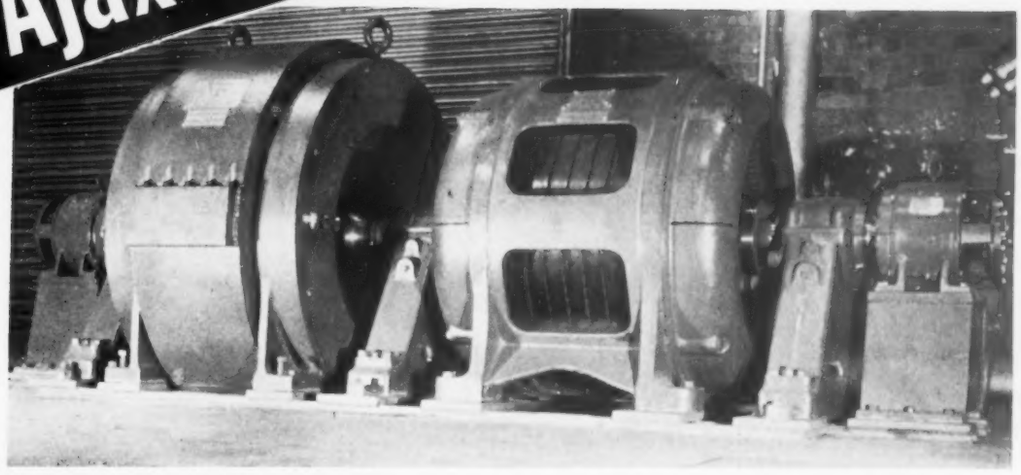
GENERAL ELECTRIC

DEPENDABLE! HIGH-FREQUENCY POWER for Ajax-Northrup Furnaces



Westinghouse 300 KW., 960 cycle synchronous motor-driven high-frequency generator, supplying power to an Ajax-Northrup melting furnace.

On numerous successful high-frequency installations by the Ajax Electrothermic Corp., Westinghouse electrical systems have proved worthy team-mates for the Ajax-Northrup coreless induction furnace.

Westinghouse motor-generator frequency changers, control and power factor correction equipment . . . designed particularly for the job in hand . . . feed to the furnace a dependable supply of power, accurately controlled, economically provided.

GENERATORS—The inductor type Westinghouse generator performs at high efficiency, is quiet in operation, and has a record for remarkably low maintenance.

CONTROL—The meters and switches on Westinghouse switchboards are ample in capacity and are designed and tested for high frequency operation. The entire unit is calibrated and tested in the factory.

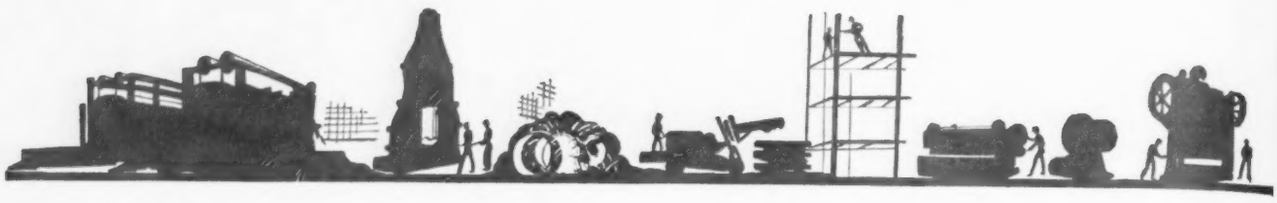
CAPACITORS—Westinghouse capacitors, which compensate for the extremely low power factor load, are equipped with sealed type terminals—an exclusive feature which prevents oil leakage.

When you buy an Ajax furnace for melting or heat-treating, it will pay you to specify *Westinghouse* electrical equipment.

WESTINGHOUSE 1886 W 1936 GOLDEN JUBILEE

Westinghouse

Methods and Materials



Steel Given Stainless Surface by Adaptation of Chromizing Process

COMMERCIAL application of a process for chromizing the surface of steel to impart corrosion and heat-resisting properties, and for subsequent working of the chromized material, appears feasible as a result of research work recently conducted by Cooper Products Inc., Cleveland. Chromizing is comparable to sherardizing and calorizing with the exception that the latter two involve the use of zinc and aluminum, respectively, while the former requires use of a specially compounded chromium metal powder.

Chromizing on a laboratory scale was patented some years ago by Floyd C. Kelley for the General Electric Co. Last year the Cooper organization acquired Kelley's patents and instituted research to adapt the process to commercial use. In general, the revised process involves the use of steel bars or billets, round or square in cross section, and placing them in a container surrounded with powdered chromium into which other compounds have been added. The container is placed in a furnace, heated to 2400 degrees Fahr. for a specified length of time to permit penetration of the chromium into the surface of the steel.

Depth of Case Determined

Experiments have indicated the advisability of chromizing to a depth which would make the chromized area on a cross section equal to 10-20 per cent of the entire section. On a bar of 1½-inch diameter, this would indicate a maximum case depth of 0.060-0.070-inch.

After cooling, the steel is found to have a surface layer analyzing about 25-30 per cent chromium—in effect, a stainless steel outer surface, with all the corrosion and heat-resisting properties of stainless steel.

The chromized steel may be subsequently rolled down into the form of sheets, strip, plates, wire and other forms, retaining an unbroken surface layer of ferrochrome at all times, the thickness being reduced proportionately as the cross section of the steel is reduced. Original working is done hot, and after suitable reduction, hot or cold working may be done without deleterious effect on the surface. Heating temperatures for hot rolling are somewhat lower than with mild steel, in view of the fact that the surface layer has a tendency to become mushy if it is heated to too high a temperature.

To determine what happens to the chromized case after rolling, several samples which had been sharply reduced in cross section by rolling were immersed in nitric acid and allowed to remain until the inner steel core had been consumed entirely by the acid, leaving the chromized surface unattacked. In every test a complete, unbroken shell remained.

A number of modifications of the process appear possible. One might be to start with an alloy steel, such as a nickel steel, molybdenum steel, etc., which provides certain special physical properties desirable in the finished product. By chromizing and rolling to size, a stainless surface is obtained in addition to the extra properties of the alloy. Furthermore, it is believed possible to add other metallic powders, such as nickel, to the chromium and obtain a chromium alloy case on the steel.

It is estimated that steel can be

Arc Welded, Steel Core Wall

ARC welded steel sheet piling is being used for a core wall at the Fort Peck dam on the Missouri river in Montana. In addition to preventing seepage through the dam's foundation, the wall acts as an impervious diaphragm and also provides a bond between the foundation and the dam since it projects 20 feet under the latter. Arc welding also has been found effective in taking the slack out of steel piling after it has been filled. This illustration, furnished by the Lincoln Electric Co., Cleveland, shows an arc welding operator at work on the wall

chromized commercially for approximately 4 cents per pound which would mean that a stainless-surface steel could be produced for the cost of mild steel plus 4 cents per pound.

M. D. Sarbey, secretary of Cooper Products, foresees a broad field of applications for the material. Automobile bumper and body stock, oil refinery steel, building steel, containers and other uses where a high-strength stainless metal is required are seen as possibilities. One leading steel producer is reported to be experimenting with the process, with a view to placing it in production. Cooper Products is an independent research organization and has no producing facilities. H. S. Cooper is president.

New features of the process are being covered by patent applications.

S S S

Uses Unusual Device To Encourage Idea of Safety

A unique device is employed by the American Can Co., Chicago, to instill in new employes a safety-minded attitude. This device is described by H. S. Putnam, manager of the company's insurance department, in the December issue of the *Power Press Safety News Letter* published by the National Safety council, Chicago.

Just outside the first aid room stands a double door cabinet approximately 54 inches high, 25 inches wide and 4 inches deep. Painted on the doors is the wording "Open These Doors and See the Best Safety Device Known." All new employes are instructed to read the words, then open the doors. With the doors open, the workman sees himself revealed in a full-length mirror on which are stenciled the words "I AM IT."

S S S

Increases Life of Valve Drills by Hard Facing

Hard faced drills for drilling and descaling cast iron valve bodies are found to last 4 to 10 times longer than plain alloy steel drills, according to the experience of a valve manufacturer in the state of New York. These top drills range from ½ to 2 inches in diameter.

Drills hard faced on the cutting edges of the teeth with a cobalt-chromium-tungsten alloy made by the Haynes Stellite Co., Kokomo, Ind., are said to remain sharp for countersinking from 40 to 102 castings, without regrinding, depending upon the amount of scale encountered. The usual life between grinds of the alloy steel drills is from 8 to 10 castings.

S S S

Welding Salvages Rolls

A paper mill was faced with a large expenditure for replacing a number of 23-inch diameter rolls which had become too short for efficient service. An oxyacetylene service operator demonstrated that disks could be bronze welded on the ends at a cost of $70, as against about $3000 for replacement with a new roll.

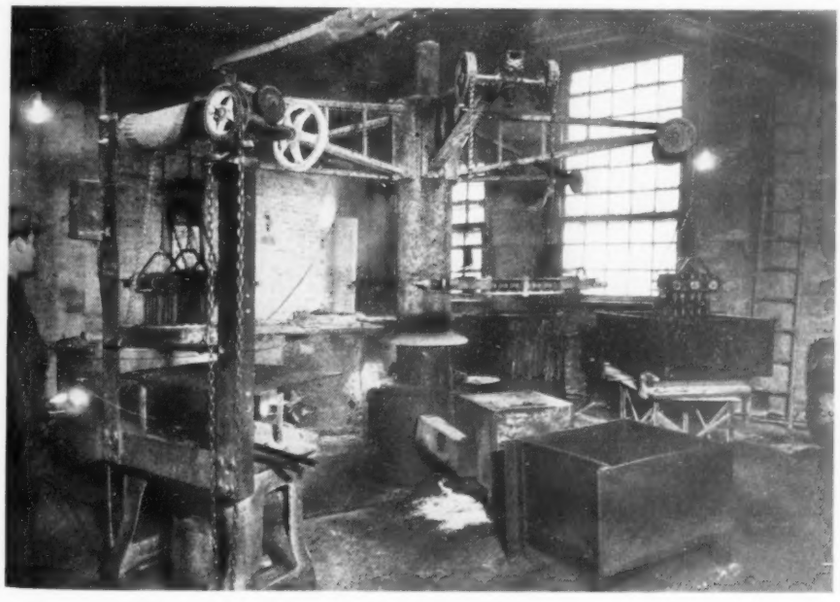
Six-Station Vertical Turret Machine Used in Case Hardening Staybolts

IN THE case hardening and normalizing of flexible forged steel staybolts, several very important factors must be observed carefully, such as the time element, the hardening bath, depth of immersion, and quenching and washing. To maintain close control over these factors in continuous production, the Flannery Bolt Co., Bridgeville, Pa., employs a specially-constructed, six-position, vertical turret machine provided with six arms, each having a bolt chucking mechanism suspended at the end. The working circle of the turret has in its six positions stations for loading, preheating, final heating, quenching, washing, and unloading.

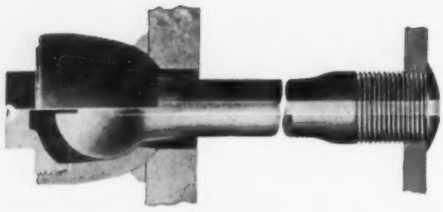
This interesting machine is shown in operation in the accompanying illustration. The variety of sizes and length of staybolts to be treated makes it necessary to have a universal chucking mechanism which will chuck about 45 bolts and hold them in a vertical position with the heads down and the bottoms of the heads at a predetermined level.

The vertical turret is entirely automatic in its operation. During the time the chuck is in the loading position, it is being loaded with bolts. The chucks over the preheating and final heating furnaces are in the lowered position holding the bolts with their heads submerged in their respective baths; the chucks over the quenching and washing baths are holding their bolts in them; and the chuck in the unloading position is in a raised position and needs only a pull on the chucking lever to drop all of its bolts into a receiving tub immediately below.

At predetermined or set intervals the vertical turret automatically rises sufficiently to lift all the chucks with their bolts from their respective baths and then the turret revolves one-sixth turn and descends to its set level, thereby advancing the bolts to their next operation. With each one-sixth turn, the newly chucked bolts are placed in the preheating furnace bath, the preheated bolts in the final heating furnace



This six-position, vertical turret machine was developed to case harden the heads of flexible staybolts on a continuous basis. The six stations of the turret are loading, preheating, final heating, quenching, washing and unloading. As many as 45 bolts can be accommodated in each bolt holding fixture



Sectionl view of ball and socket type staybolt. The surfaces of the ball and socket are case hardened to reduce friction and wear

bath, the final heated and carburized bolts in the quench tank, the quench tank bolts in the washing bath, and the washed bolts at the unloading station over the receiving tub. The operator then pulls the unchucking lever and the finished bolts fall into the tub. Thus, at each turret movement one complete chuck load of bolts is completed.

The function of a staybolt in a boiler is to support the boiler sheets and keep them from bulging under pressure. This is particularly necessary with flat surfaces. The difference in temperature between the fire sheet and the outer sheet of a boiler causes an irregular movement of these sheets because of uneven expansion, and as a staybolt has to maintain the proper positions of the inner and outer sheets, it is obvious that there should be more flexibility in the bolts than is provided in the metal of the bolt itself.

With the Tate type bolt manufactured by the Flannery company, this is accomplished by using a ball and socket joint. A sectional view of one of these bolts is shown in the illustration above. As the flexing movement is small, the friction between the ball and socket is relatively large and as there is no way to lubricate it, the contacting parts should be such as to reduce friction and thereby lessen abrasion.

With the company's Nu-Tate bolt, this is accomplished by the previously described process of case hardening the round head of the bolt. This not only reduces the friction of the head during the slight flexing movement, but as a part of the process also normalizes the bolt forging and develops the full fatigue resisting qualities of the metal from which the bolt is made.

Composite Steel and Wood Tailgate Light but Strong

Advantages of lighter weight, greater strength and better appearance are claimed for the use of composite wood and steel sections in the fabricatiton of tailgates for motor trucks. Shown in the accompanying illustration is a tailgate section made of Met-L-Wood, a product of the Met-L-Wood Corp., Chicago. The service or working side, which is exposed when the tailgate is lowered, is galvanized four-way safety tread steel, while the opposite side is 27-gage galvannealed steel. Both sheets are securely affixed to plywood with a fabric bond.

Overall thickness of the tailgate is ⅛-inch at the edge and the weight is 7 pounds per square foot. It is reinforced by a ⅛ x 1½-inch channel around the edge but does not require additional reinforcement on the short dimension. No wood surface is exposed.

New Piston Ring Permits Positive Oil Control

A new piston ring, known as Steel-Vent, developed by Hastings Mfg. Co., Hastings, Mich., is the result of extensive research work by this company to design an engineeringly sound oil ring that will provide positive oil control in badly worn motors without resort to blow-by. So efficient is this ring in controlling oil, says the company, that only one ring of this type is required for each piston, the ring being installed in the bottom oil groove.

Because of efficiency of this new ring, only one ring is recommended per piston

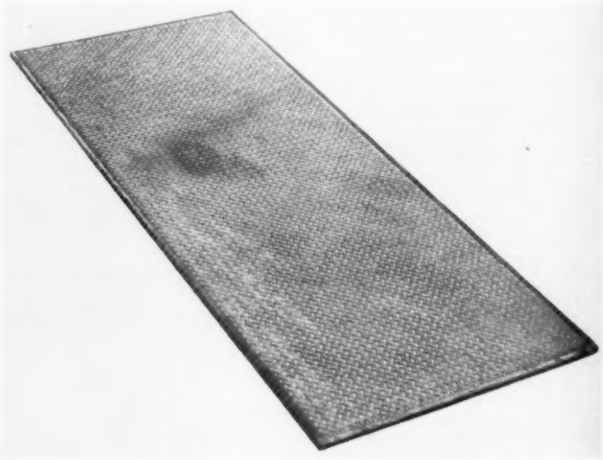
Shown in the accompanying illustration, the new ring consists of four pieces, two steel segments, a ventilating spacer and an expander of spring steel which fits back of the assembly in the same manner as in the flexible ring. The steel segments, of alloy, wear-resisting steel, work independently of each other, thereby conforming to cylinder wall taper, waves and variations. High unit pressure is possible because of the narrow wall contact and the long wearing steel contact surfaces of these segments. Quicker and more positive seating is secured through the more accurate machining of the contact surfaces.

Spectrography Symposium Is Published by A.S.T.M.

American Society for Testing Materials has issued in pamphlet form the symposium on spectrographic analysis conducted at its annual meeting last June. This symposium was arranged by the society's committee E-2 on spectrographic analysis to give those working in this field definite information on methods in current use in industry and to indicate to those not engaged in this work but who are interested in obtaining more rapid and reliable test methods important applications of spectrographic analysis.

In published form of 51 pages the symposium comprises six papers by technologists in the field and the discussion of the papers. One paper covers the spectroscopic analysis of steels and the influence of nonhomogeneous samples. This is followed by a description of the use of the spectrograph in the platinum industry, and in turn by a paper on quantitative spectrographic analysis of magnesium alloys for manganese and silicon. In this field the spectrographic method has in several cases replaced chemical methods.

A fourth paper covers spectrographic determination of impurities in commercial cadmium and the application of the procedure to the analysis of cadmium-base alloys and cadmium compounds. The purification of graphite electrodes for spectrochemical analysis is detailed in another contribution, which is important because the

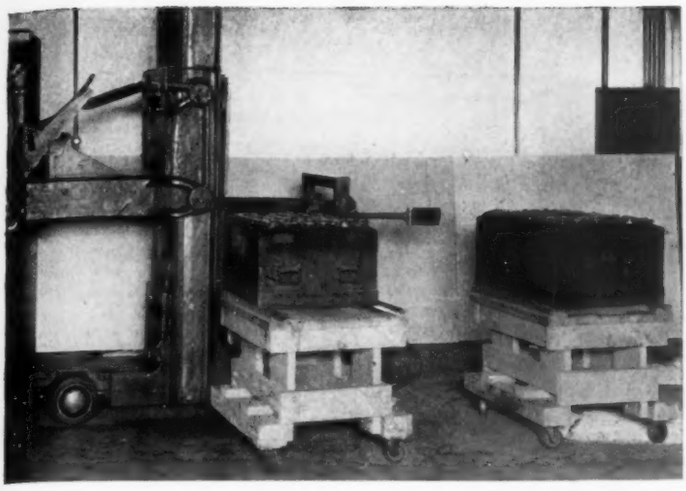


Weighing only 7 pounds per square foot, this composite steel and wood truck tailgate has four-way safety tread steel on one side and 27-gage sheet steel on the other side

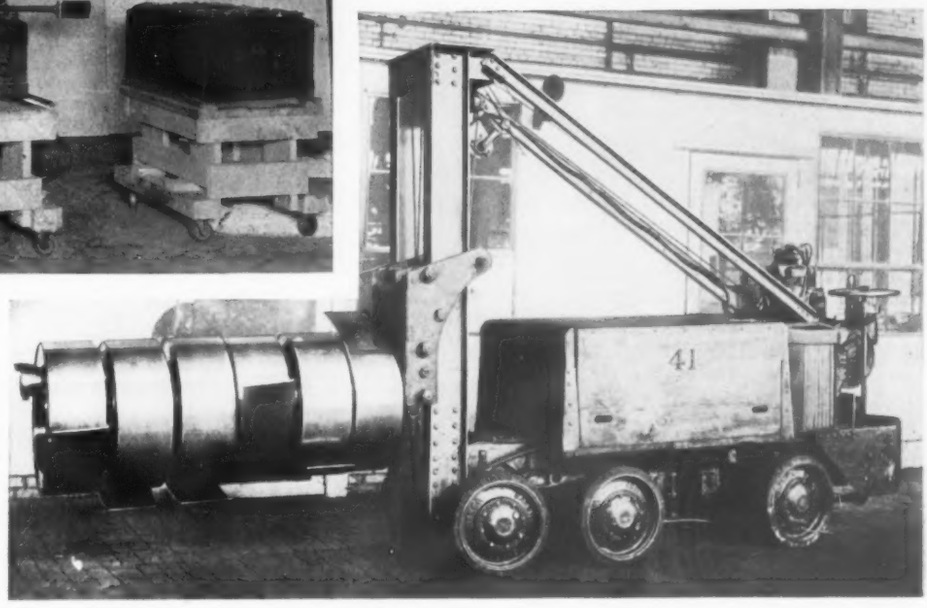
Exide IRONCLAD BATTERIES

WITH EXIDE MIPOR SEPARATORS

"MIPOR," Reg. U. S. Pat. Off.



To change batteries, it is only necessary to push the discharged one from the truck to the skid, wheel it to the charging panel, and slide the freshly charged battery into its place.



Continuous 24-hour materials handling service with EXIDE-IRONCLAD BATTERIES

MANY plants running two or more shifts a day have learned that they need sacrifice none of the performance, safety and economy provided by battery-powered electric industrial trucks . . . that two sets of Exide-Ironclad Batteries a day will keep a truck in continuous productive operation.

Changing batteries takes less than five minutes. Skids are used, of the same height as the bottom of the battery compartment of the truck. It is easy to slide an Exide-Ironclad from the truck to the skid, and vice versa. The battery remains on the skid during charge.

In an actual test recently, two Exide-Ironclad Batteries, Type 18 TLM 21, were changed with an overhead chain hoist in 1 minute, 39 seconds.

Batteries are the safest, most dependable and economical source of power available for all types of industrial trucks and tractors. And Exide-Ironclad Batteries, because of their extreme ruggedness and special construction, give years of trouble-free, day in and day out service in heavy duty work, where cycle follows cycle of discharge and charge.

Write for free booklet, "Facts for Consideration in Selecting a Battery."

THE ELECTRIC STORAGE BATTERY CO., Philadelphia

The World's Largest Manufacturers of Storage Batteries for Every Purpose

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reliability of these methods depends to a great extent on the purity of electrodes used. The final paper on quantitative analysis of nonferrous alloys by spectroscopic methods discusses the determination of aluminum and barium in nickel alloys, magnesium in zinc alloys and chromium in nickel.

Copies of this publication in heavy paper cover can be obtained at 65 cents each from the American Society for Testing Materials, 260 Broad street, Philadelphia.

Silver Coatings Protect Carbon Steels in Annealing

A thin coating of silver has been found to furnish excellent protection to carbon steel during annealing, according to H. S. Rawdon, chief of the division of metallurgy, national bureau of standards, Washington.

In the course of some recent work at the bureau, which required the full annealing of both medium-carbon and high-carbon steels with the utmost protection against oxidation or decarburization of the surfaces, it developed that silver coatings to accomplish this end are probably not so well known or so widely used as are other methods of protection.

Polished mild steel surfaces bearing finely engraved designs may be coated with a thin electrolytic deposit of silver, annealed, and the silver stripped electrolytically, leaving the steel surface in practically its initial condition. Electroplated silver has also been used to protect rather thin sections of high-carbon steel pieces during annealing with assurance that the insolubility of silver in iron will prevent modification of the chemical composition of the steel by penetration of the silver.

World Iron and Steel Data and Tariff Duties

Statistics of Iron and Steel Industries, 1935; cloth, 265 pages, 7 x 9½ inches; published by British Iron and Steel Federation, London; supplied by STEEL, Cleveland; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London.

This is an annual publication of the British Iron and Steel Federation, containing in detail information regarding production, materials consumed, imports and exports and other matters for 1934 and historical statistics on production, foreign trade and other matters for the chief iron and steel producing countries of the world.

A section on tariffs gives import duties on iron and steel products for the more important countries and has been considerably extended. This information is not known to be published elsewhere.

Welding, etc. . . .

by Robert E. Kinkead

IN THIS column, the author, well-known consulting engineer in welding, is given wide latitude in presenting his views. They do not necessarily coincide with those of the editors of STEEL.

Some Guessing

AUTHORITATIVE information on the amount of welding rod used by electric arc and oxyacetylene welding in 1935 has not been published. A good guess is that in the neighborhood of 40,000 tons of such welding rods was consumed. This is about 2 per cent of the total production of all wire products. Unlike other markets for wire, that used for welding disappears when it is melted in the welding processes. Between 75 and 80 per cent of it becomes weld metal on the job and the remainder evaporates in the welding heat or appears as scrap in stub ends.

The figure of 30 pounds of weld metal per ton of welded construction is often used as an average on welded construction. This would indicate that about 2,600,000 tons of steel was welded by gas and arc welding alone during the year. Electric resistance welding would be applied to at least that much more steel. About 5,200,000 tons of steel probably were fabricated by welding during the year 1935. This is some 25 per cent of the total production of finished steel. The welding industry is an important business.

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Opportunity for Inventors

MONTH by month new strip mill capacity is ordered by steel producers. The latest project of the Jones & Laughlin Steel Corp. tops the list. Widely extended use of strip steel is forecast by the mere fact that a large excess of capacity is being installed to produce the material.

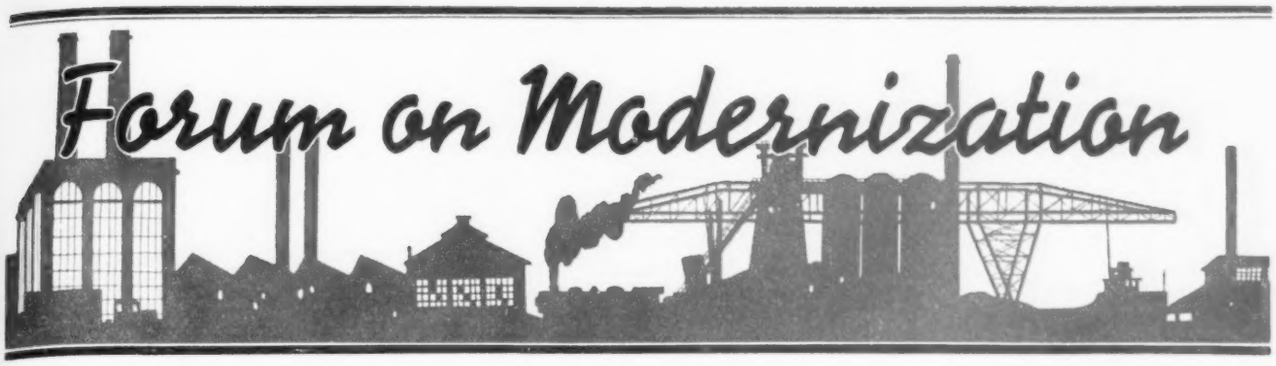
Every welding technician who has intelligence enough to read a newspaper knows that great developments lie ahead in the welding of relatively thin metal. From time to time, we have called attention in this column to new welding processes which are on the way to the market. An audit of our technical resources in the matter of welding thin metal reveals that we have spot, butt and flash welding, oxyacetylene flame, pure oxygen, electric metal and carbon arc, and atomic hydrogen welding processes available. All six processes have been developed commercially and are in successful use. But it would be going much too far to say that we know the limitations of any of them at the present time.

Elihu Thompson found a new source of welding heat when he invented spot, butt and flash welding. Every other process which followed was based on a new source of heat for welding. The new process which is coming over the hill today is based on a new source of welding heat, believed by many to be high-frequency mechanical vibration. A few years ago a successful process was developed based on heat from induced eddy currents. It is foolish to say that there are no new sources of welding heat. The year 1936 will certainly see several new inventions in this direction.

The welding industry is going to town this year for the very reason that new processes and methods are welcomed with open arms. The better the manufacturing public is served in welding, the more welding is done and the more prosperous everyone becomes. Inventors of new processes for the welding of thin metal will find a cordial reception awaiting them.

• • •

Modern motor buses offer great convenience to the traveler, but there is much improvement to be made. Recently we rode a bus which the driver hurled over a bump and dropped on a weak bridge floor at 50 miles per hour. That was dangerous and we did not like it. The driver knocked down our $2 fare and then lost it in a slot machine at the first rest station. The management of his company would not like that.



Delayed Plant Rehabilitation Impairs Capacity To Fill Probable Demands

BY EDMUND BURKE
Manager of Industrial Sales, Crane Co., Chicago

A FEW years ago when the depression was at its lowest ebb, a national movement was started for stimulating manufacturing plant rehabilitation. Industry generally had ceased to buy even normal replacements. There was much idle equipment, and parts of this idle equipment were removed to repair machinery in use, instead of buying new parts.

At that time, after three years of starvation maintenance, many leading industrial executives throughout the country lent their support to the national movement for plant rehabilitation. And much good was accomplished in spite of the competition of the worst economic reverses in the history of our country, and the world at large. Inasmuch as recovery did not return as quickly as it was hoped, American industry managed to get along fairly well with the improvements made at that time. But as far as the immediate future is concerned, judged from all possible reasonable trends, industry today is in even worse condition to meet probable demands upon it than at the time mentioned.

Idle Capital Available

Recovery is no longer a will-o'-the-wisp; it is an actuality. American business again is "in the black"; it is paying dividends; it is absorbing the unemployed; it is increasing wages. None of these activities, of course, is comparable to the prosperous years of the late twenties, but in contrast to the early thirties they denote much progress.

Nearly every business economist of recognized standing anticipates a period in the immediate future so pregnant with activity that unless industry at large — manufacturing, transportation, fabrication, etc. — puts its house in order by modern equipment and modern methods, industry will not be in position to cope with demands made upon it. Why industry should hesitate to do that is difficult to understand, in view of the millions of idle capital waiting to be used, and the present low price level of most commodities.

Save Pennies, Lose Dollars

Someone has said, "You pay for what you need whether you buy it or not." A little reflection upon that statement proves its truth. Apply it to a manufacturing plant. A machine, for example, is built to perform certain definite operations. The foreman specifies a low-cost, inferior grade of lubricant, perhaps to save a few dollars. Or the operator is less experienced than the machine requires. Result: The machine either ceases to function through improper care, or its output is restricted through inefficient control. A good grade of lubricant, or an experienced operator, probably would have prevented that result at little cost, and allowed the machine to run at a profit. Thus, the owner was paying for something he needed but didn't buy.

In piping materials, there are countless places that can produce profits or losses by the spending of, or failure to spend, a few dollars. A leaky valve, for instance, if neglected, may cause the impairment of an entire pipe line, thus costing many fold the corrective measures necessary at the start. Or perhaps the wrong type of valve is used, again resulting in inefficiency. A gate valve, for example, installed in a line where throttling is necessary, will soon become useless. Properly selected globe valves should be used for throttling service.

Depression Improvements

Stop check valves, if too large, will chatter, hammer, and wire-draw, cutting and destroying the seating surfaces. Loss of condensate by blowing drains to the sewer, or to atmosphere, is exceedingly wasteful. The condensate should be piped back to the apparatus requiring hot water, or to the boiler. Drip pockets and separators should be equipped with water gages to indicate accumulation of condensate. Improper or inadequate handling of condensate is one of the most expensive of all piping wastes in any plant using steam or air.

Other needless wastes grow out of patchwork piping, unnecessary joints in the lines, corrosion, scale and dirt in piping, excessive vibration and faulty or improperly installed supports and anchors. Many other examples could be cited, all of which prove that by spending a little, a lot would be saved. And inasmuch as all these things eventually are corrected —at greater cost—it proves again that you pay for what you need whether you buy it or not.

What does industry need? The facilities to operate on a profitable basis. Throughout American manufacturing plants today may be found countless installations of obsolete equipment—equipment that is ten, 15, 20 years old, or older. While most industrial materials are made to give long service, even five years of use make a great deal of such materials out-of-date for the reason that during recent depression years, when industry had a lot of time on its hands, it was by no means idle time. More improvements in industrial equipment have been made during the past five or six years than for a decade preceding the depression when manufacturers were too busy with production problems to give suf-

ficient thought to improving their product, or their facilities.

Space will not permit the mention of even a representative catalogue of new devices, new methods, new materials. One of the greatest developments, however, has been in the field of metallurgy and chemistry. Countless new alloys and plastics have revolutionized industrial progress and added much to the comfort, convenience and security of mankind, such as, heat resisting rustless alloys, stainless steel, aluminum alloy, shatter-proof glass, plastics of all kinds—colorless, odorless, tasteless, non-inflammable — which may be molded and shaped at will, new fibers, solvents and lacquers, *ad infinitum*.

To modernize simply means to accept, or adopt, modern (present) customs or ideas. No individual and no business organization can live long in the past. Yesterday is history; tomorrow is only a few hours distant. And the individual or business concern that anticipates tomorrow cannot ignore the progressive development implied in the word "modernization."

Electroplating Industry Keeps Pace With Modernization Movement

BY C. W. YERGER
Vice President, Hanson-Van Winkle-Munning Co., New York

THE electroplating industry has learned many lessons from conditions existing during the past few years. The result is the development of new processes for more rapid plating, the elimination of various operations, and the general improvement and modernizing of plating room equipment. The general trend is to enhance the beauty and the protective qualities of the finishes of metal objects.

Electrodeposit Thickness

Electroplating of a few years ago was characterized by the excessive use of labor. Production was dependent upon the operator and in a good many cases plating was practiced by rule-of-thumb rather than through scientific methods. As a result thickness of deposit was questionable and rejects in actual production were considerable. With modern equipment and methods there has been the tendency to eliminate the human factor and to obtain more uniform and better plating throughout.

Further to improve results obtained, standard specifications for electroplating on steel have been published. They are based upon the result of several years of joint research work by the American Electro-Plater's society, the American Society for Testing Materials, and the bureau of standards. The thicknesses of electrodeposits have been found to be the essential factor in the production of work that has the necessary qualities and wear and protective resistance.

There has been considerable development in the improvement of electroplating solutions and processes so that results hitherto not deemed possible are now available on a production basis.

Bright Nickel Solutions

One of the outstanding features has been the development of bright nickel solutions from which nickel deposits are had which need no buffing and can be plated directly with chromium. This gives a marked improvement in brightness of deposit and wear resistance as contrasted with old methods. Where nickel deposits were previously buffed it was a question of how much nickel was still left on the article, but with the present process which needs no buffing this thickness can be accurately determined. The most marked improvement in the bright nickel finish has been that of a cobalt-nickel alloy which has a fine bluish-white appearance, and which takes a beautiful chromium deposit. In bright nickel processes the production has been radically stepped-up by increased current densities which tend to put on much thicker and better deposits in a much shorter time.

Bright zinc deposits have taken their place with bright nickel. It is now possible to have a protective coating of zinc on iron or steel, as well as to obtain an ornamental finish that adds materially to the sales value of the manufactured article. Here again the production has been increased and improved by use of higher current densities.

In line with the better electrodeposits, a platers' microscope has been developed for quickly and accurately measuring the thickness of electrodeposits.

There are many other new processes in development which it would be possible to mention, but we will simply summarize them: Development of better fluxes for galvanizing and tinning, a black finish on steel, and the general improvement in the construction of buffs and buffing compositions, and of equipment, such as full automatic and semiautomatic conveyors, plating barrels and plating generators.

Phase Diagrams and How To Interpret Them

Principles of Phase Diagrams, by J. S. Marsh and John Johnston; cloth, 193 pages; published for the Engineering foundation by McGraw-Hill Book Co. Inc., New York; supplied by STEEL, Cleveland, for $3, plus 15 cents postage; in Europe by the Penton Publishing Co. Ltd., Caxton House, Westminster, London.

This is one of the monograph series, Alloys of Iron Research, prepared under direction of the iron alloys committee of the Engineering foundation.

The aim of this book is to set forth as simply as possible, yet rigorously and briefly, how the thermodynamic principles serve to interpret correctly, and to correlate the many seemingly quite different cases which actually arise even in systems of not more than three components. The reason for the presentation is to obviate the necessity of discussing questions of interpretation of phase diagrams and diagrams of state in each of the monographs. The book should prove useful to younger metallurgists, to students, and to all willing to go thoroughly into the subject to secure an improved understanding of other metallurgical questions.

Pneumatic Wheel Casters Are Used Extensively

Pneumatic-tired steel wheel casters manufactured by the Saginaw Stamping & Tool Co., Saginaw, Mich., are being used extensively on trailers, factory trucks, and dollies in hospitals and all places where speed, silence and minimum vibration are essentials. The casters are of varying sizes and are equipped with either ball or roller bearings. Steel wheels are given a rustproofing treatment before assembly. The axle of the conventional trailer can be eliminated by the application of independent controlled casters developed by the company. The casters can be adapted to old as well as new equipment.

you'll find the rope best suited to your needs!

AND you won't find a kink in any of these sinews . . . no "charley-horse" to cripple your production.

More than 100 years of experience has taught us many valuable things regarding wire rope . . . both regarding the problems facing the industrial user . . . and in manufacturing the proper rope to lick these troublesome problems.

In fact, hundreds of companies have standardized on American Steel & Wire Company Wire Rope . . . because they have confidence in it. This confidence was gained by unusual service records, dependability and lowered operating costs.

Therefore, we would suggest that you get in touch with our engineering department for cooperation in solving your particular problems, or . . . see our nearest distributor.

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UNITED STATES STEEL

Progress in Steelmaking

Produces Open-Grain Iron

Slow cooling of machine cast iron, which affords an open grain structure similar to sand cast pig, is being employed by a Southern producer of merchant iron. The method involves fairly slow movement of the mold strand and obviates application of water on the pigs until after they have traveled many feet from the pouring trough. When the pigs are within about 30 feet from the discharge end of the machine, water is sprayed on the underside of the molds. The heat from the molten metal is transferred through the molds to the water and hence the rate of its removal is much slower than usual practice. By this arrangement the iron is given more time to deposit graphite and to form a more open grain structure. When each mold arrives at a point about 15 feet from the discharge end of the machine the top of the pig is sprayed with water. This is done to effect complete solidification of the metal and to prevent "bleeders" or soft-centered pigs. When the pigs are ejected from the molds they are given a final cooling by water sprays.

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Bearing Friction Is Low

Many of the full floating bronze bushings used in the bridge wheels of overhead cranes at an Ohio steel plant have been in service for more than five years. The bushings are free in the wheel or on the pin which is held securely by caps for quick removal. The friction with this type bearing is low.

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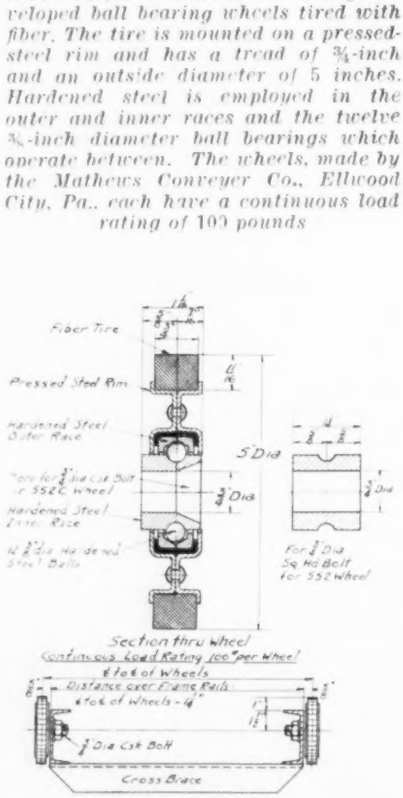
Overcomes Drain Leakage

Construction of brick pickling tanks for rod cleaning at a wire-making plant developed many interesting details appertaining to drains. One tank was built with the drain at the end and containing a ferrule of lead and a metallic plug. This type plug was abandoned, however, because of the development of small pinholes and a continuous leak. Wooden plugs next were tried and while these prevented leakage they were difficult to remove, in fact, any attempt to withdraw a wooden plug caused the ferrule to loosen. This necessitated draining the tub and resetting the ferrule in sulphur. To avoid this difficulty, therefore, an acid-proof pipe was brought out through an opening in the side of the tank near the bottom for a distance of about 5 feet and a valve screwed on the end. By this arrangement no difficulty now is experienced in emptying the tubs.

Protects Steel in Transit

NO DANGER OF SURFACE SCRATCHES—Sheets and broad strip either in the semifinished or finished state now can be conveyed in multiples to and from roller leveling machines, shears, etc., without having their surfaces marred on newly developed ball bearing wheels tired with fiber. The tire is mounted on a pressed-steel rim and has a tread of ¾-inch and an outside diameter of 5 inches. Hardened steel is employed in the outer and inner races and the twelve ¾-inch diameter ball bearings which operate between. The wheels, made by the Mathews Conveyer Co., Ellwood City, Pa., each have a continuous load rating of 100 pounds


Fiber Tire
Pressed Steel Rim
Hardened Steel Outer Race
5 Dia
¾ Dia
For ¾ Dia Sq Hd Bolt for 552 Wheel
Section thru Wheel
Continuous Load Rating 100 per Wheel
to # of Wheels
Distance over Frame Rails
to # of Wheels - 4
¾ Dia Cst Bolt
Cross Brace

Melting Cost Is Lowered

Plain carbon steels now are being melted in the recently developed top-charged electric furnace at a cost of $19.70 per ton compared to $21.66 for furnaces of the side-charged type. The savings mainly are in labor, energy and electrode consumption.

• • •

Markets Measuring Device

Temperatures in bright annealing furnaces where the hydrogen penetrating the protection tubes on base metal thermocouples causes a change in the calibration of the couples now can be measured and controlled by the use of a thermotube. Other uses of thermotubes include the measurement of temperatures of open-hearth roof and checker brick, box annealing furnaces, forge furnace walls and recuperator flues.

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Handles Broad Strip Steel

One of the largest cylindrical bell-type electric furnaces so far built for annealing coiled strip will serve the cold rolling department of a broad strip mill now under construction. The unit will handle coils of 52 inches outside diameter and in stacks 8 feet high or about 16 tons per charge. Its electrical rating will be 240 kilowatts.

• • •

Rejections Are Lowered

Of the two recognized methods employed for cooling bessemer steel in the converter, namely, by blowing steam through the metal or by adding scrap, for the purpose of finishing the heat with a light ladle skull, the latter is recommended, based on a recent investigation. Rejections in the chipping department are lowered 10 per cent. The tests disclose that scrap additions up to 15 per cent of the charge can be made without impairing the quality of the heat.

Taps Slag from Six Boiler Furnaces Every 24 Hours

BY J. H. STRASSBURGER
Steam Engineer, Weirton Steel Co., Weirton, W. Va.

ASH is being tapped from six pulverized-coal-fired boilers at the Weirton, W. Va., plant of the Weirton Steel Co. These boilers are part of a group of eight 900-horsepower, 4-drum, 3-pass boilers that were installed in 1926 for blast furnace gas firing from the rear under the mud drum into the combustion chamber. Steam is generated at a pressure of 231 pounds per square inch and is superheated to 525 degrees Fahr. Radiant-tube superheaters are located in the frontwall of the furnace directly opposite the gas burners. All walls were originally of solid firebrick; the top furnace arch was the only water-cooled surface. The furnace bottoms were constructed of firebrick, laid on concrete, and no basement or ash-hand ing system was required for the original gas-fired installation.

In 1930 some of the available blast-furnace gas supply was diverted to the coke plant for underfiring two batteries of by-product ovens, and three boilers were changed to pulverized coal firing to balance out the reduction of blast-furnace gas for the boiler house. The coal burners were located in the front wall of the boilers opposite the gas burners. A unit pulverizer, with a capacity of 8500 pounds of coal per hour was installed on each of the three boilers. Approximately one year later, water walls were installed in the sidewalls in order to reduce the maintenance cost of the solid firebrick walls which were punished severely from the coal firing. The water walls are of bare-tube construction with 25 rows of 3¼-inch tubes spaced 6 inches center to center. The headers are placed on 18-foot centers. Each wall has a projected area of 243 square feet.

Shut Down Formerly

The results from the water-wall installation were satisfactory with ratings increased from 175 to 220 per cent. During this period of operation the ash from the coal firing was removed periodically with shutdowns occurring at 30 to 40-day intervals.

The ash was handled manually and five to six days were required with eight men working three shifts to clean up a firebox for another period of operation. While operating the boilers at a higher rating than normal, the boiler-house superintendent discovered that one boiler contained a molten

The accompanying paper was contributed by the fuels division at a recent meeting of the American Society of Mechanical Engineers in Cincinnati

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mass of slagged ash. The slag was approximately 22 inches deep, and it was necessary to remove it in order to continue operation. The slag was

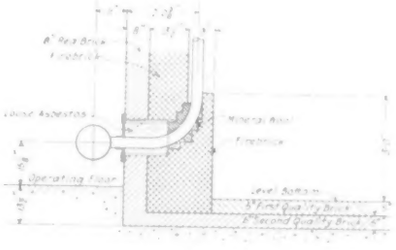


Fig. 1—Bottom No. 1, life one year

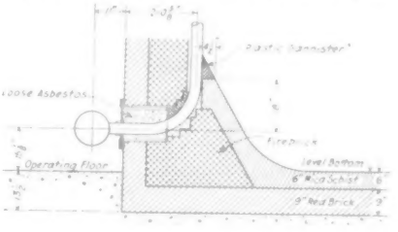


Fig. 2—Bottom No. 2, life six months

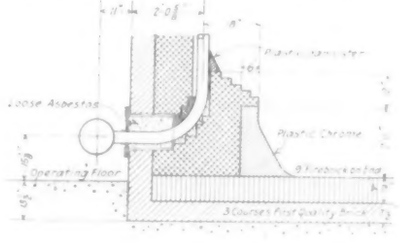


Fig. 3—Bottom No. 3, in use two years

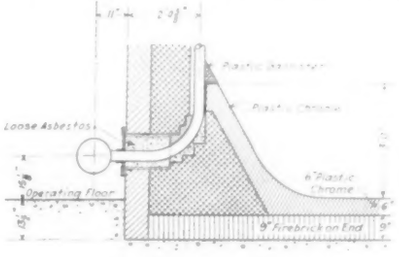


Fig. 4—Bottom No. 4, in use two years

baled out with hand ladles until the level was lowered to a depth of 6 inches, which made it possible to operate until the week end. At that time a hole was cut into the sidewall below one of the ash doors and the slag was allowed to run out on the floor and chill. To say the least, a busy time ensued in handling this mass of slag. It then was decided to run the slag into a trough and sluice it to a pit about 50 feet from the boiler. Water at a pressure of 80 pounds was available and one 2-inch nozzle, swedged to form a flat spray, was used below the tapping hole to break up the slag as it emerged. A second nozzle was located about 20 feet from the boiler to sluice the slag to the pit.

This method of slag removal made it possible to operate the boilers at 300 per cent of rating and during 1933 three additional boilers were converted to coal firing with water walls and slag tapping in order to obtain more steam required for expanding plant operations.

How Design Progressed

The original flat bottom shown in Fig. 1 and designed as bottom No. 1 was installed with the original water walls. It consisted of the concrete pad with two flat courses of second-quality firebrick followed by two flat courses of first-quality firebrick. A vertical brick wall about 2 feet high was constructed in front of the lower water-wall bends to protect the wall boxes from the slag. This type of bottom lasted one year after slag tapping was started.

Fig. 2 illustrates bottom No. 2. It was built of mica schist rock and consisted of 6 inches of rock built on 9 inches of brick. The mica schist rock tended to loosen and float out with the slag so that this type of construction was abandoned after a period of six months.

Bottom No. 3 shown in Fig. 3 is now in use on five boilers and has given satisfactory service for two years. It consists of three flat courses of first-quality firebrick on the top of the concrete pad, followed by a course of brick of the same quality placed on end. The brick are laid with dry ground joints, in a manner similar to the method of laying brick in the hearth of a blast furnace. The entire floor then is brushed with a thin fireclay grout. The wall boxes are protected by a 36-inch vertical firebrick wall faced with 6 inches of plastic chrome sloped out to the bottom. It required 18 hours and a total force of ten men to install this bottom.

Bottom No. 4, illustrated in Fig. 4, was built at the same time as bottom No. 3. It consists of one course of 9-inch firebrick laid on end with 6 inches of plastic chrome placed on top of the brick. This construction also has been in operation two years. It has been satisfactory and is still in good condition. It took six men eight

hours to install this bottom. The cost of bottoms No. 3 and 4 is approximately the same, inasmuch as the higher cost of plastic chrome in bottom No. 4 is balanced by the increased labor cost of building bottom No. 3 with the ground-joint brick construction.

Slag is tapped from each boiler once every 24 hours and the slag level is lowered from 18 to 6 inches at these periods. Two men tap six boilers during an eight-hour shift, whereas it required eight men three shifts per day to dig the ash out of the furnace bottoms under the old method for each boiler cleaning period. The furnace bottom is sloped toward the tapping hole as shown in Fig. 5. The tapping hole is one course of brick 4½ inches wide and six courses 15 inches high and is shown in section in Fig. 6.

When tapping slag, the top brick are removed first, and, as the slag level lowers, additional brick are taken out as required to keep the slag flowing. Fly ash is used to keep the slag from sticking to the walls of the tapping

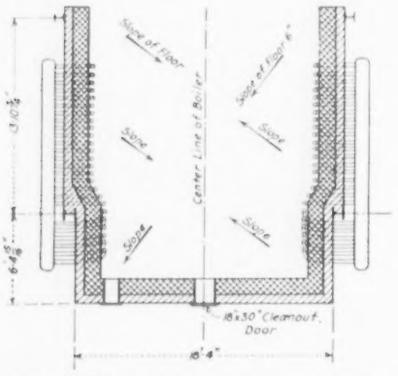


Fig. 5—Plan view of furnace bottom with floor sloped 6 inches in direction of tapping hole

hole and aids materially in keeping a steady flow of slag. In closing the tapping hole it first is cleaned, and then the brick are placed in position. Fly ash is used to fill the void inside the tapping hole and prevents the slag from adhering to the brick at that point. Fireclay finally is used to seal the tapping hole on the outside.

The boilers are operated the majority of the time on coal firing, but blast-furnace gas is used over weekends. During these periods, the slag freezes in the bottom and it requires from 12 to 18 hours of coal firing to melt this slag for tapping. The iron ore and limestone dust deposited from furnace gas act as a flux in melting the slag.

Boiler operating conditions are varied considerably, but the slag-tapping operation has been maintained successfully. In the furnace proper CO_2 is maintained at 14 to 15 per cent. The pulverizers are operated so that 98 per cent of the coal passes through a 50-mesh screen. As long as the coal is sufficiently fine to prevent sparklers

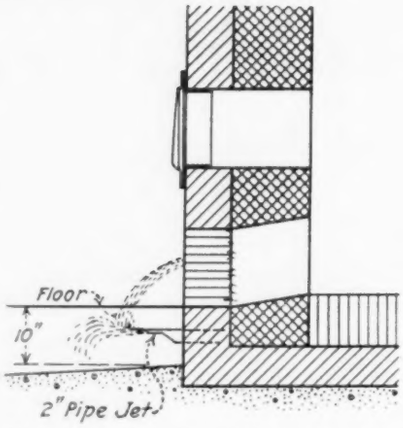


Fig. 6—Section through tapping hole

in the burner, it has been found satisfactory for keeping the slag in a molten condition.

Some operating data are as follows: Ratings are from 40,000 pounds per hour (140 per cent) to 80,000 per hour (300 per cent), with an average of 65,000 pounds per hour (240 per cent). The furnace draft is 0.15-inch of water; the CO_2 in furnace is 14 to 15 per cent. Evaporation amounts to 10.2 pounds of water from and at 212 degrees Fahr. per pound of coal as received. The flue-gas temperature is 600 degrees Fahr.; the boiler efficiency 77.5 per cent. The heat liberation in the boiler furnace varies from 10,500 to 16,500 B.t.u. per cubic foot.

Introduces New Electrode For Stainless Steels

A new arc welding electrode for welding the group of stainless steels belonging to the 25-12 per cent chrome-nickel class was announced recently by Lincoln Electric Co., 12818 Coit road, Cleveland. Because of its higher chrome content, the electrode is claimed to be particularly advantageous for welding stainless-clad steels.

Designated "Stainweld B", the new electrode provides weld metal of the same characteristics as steel containing 25 per cent chromium and 12 per cent nickel. Furthermore, the weld metal has high corrosion resistance, high tensile strength and ductility possessed by the 25-12 alloy steels.

The electrode is heavily coated, utilizing the shielded arc principle of producing welds free from oxides and nitrides, brittleness and porosity. Tensile strength tests show that the weld metal resists a stress of 95,000 pounds per square inch; test coupons broke under this stress after the area had been reduced to make failure come in the weld. It is stated that the deposited metal possesses the same resistance to corrosion as 25-12 plate.

Deposits from the electrode are said to maintain their physical properties at high temperatures and scaling is reduced to a minimum for this type of material. Abrasion resistance is exceptionally high.

The manufacturer states that with Stainweld B and Stainweld A previously introduced for 18-8 steels it is now possible to arc weld practically any of the more extensively used stainless alloys. The new electrode is available in 5/32 and 3/16-inch sizes in 11-inch lengths. It comes packed in 15-pound containers in the smaller size and 10-pound containers in the larger size.

Recommends Safe Practice For Handling Gases

G. T. Williams' paper on "Safe Handling of Gas in the Steel Industry" presented at the twenty-fourth annual safety congress and exposition of the National Safety council, Louisville, Ky., Oct. 14-18, 1935, has been published in an 8-page pamphlet. Mr. Williams, superintendent of blast furnaces and coke plant, Youngstown Sheet & Tube Co., Indiana Harbor, Ind., suggests methods of avoiding dangerous atmospheres as well as of working with gas mains through which combustible gases are conveyed. Coke oven, blast furnace, natural, producer and oil refinery gases are discussed. Copies of the pamphlet are available at 10 cents each from the National Safety council, 20 North Wacker drive, Chicago.

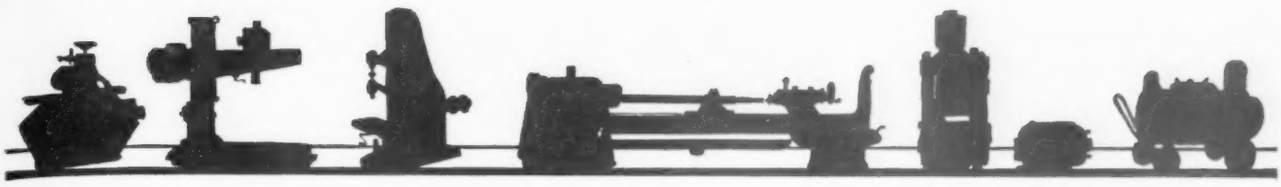
Winter Air Conditioning With Oil Fired Units

An oil fire, air conditioning system, known as the Moncrief Aristocrat, has been developed by the Henry Furnace & Foundry Co., 3741 East Forty-ninth street, Cleveland. It may be used with any type of oil burner for winter air conditioning. It also may be used for summer cooling to the extent of exhausting basement cooled air into the upstairs living rooms.

The case and floor of the unit are formed of 24-gage galvanized sheet steel, and painted with a red and black, oven baked, crackle finish. The drum is of 3/16-inch and the radiator of 9-gage sheet steel. The wind box is of 24-gage galvanized sheet. All joints are electrically welded excepting those in the head of the drum which are riveted. The unit is equipped with motor driven blower, with automatic humidifier and with screens of the glass fiber or steel wool "throw-away" types.

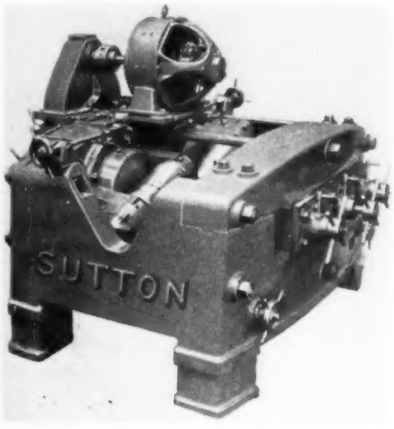
The company also manufactures air conditioning units for gas heating equipment and for hand and stoker fired coal equipment.

New Equipment



High-Speed Tube and Bar Straightening Machine—

Sutton Engineering Co., Park building, Pittsburgh, is introducing a new machine equipped with driving rolls that are independently axially adjustable, thus insuring a perfect line of contact for whatever diameter of material the machine is set up to handle. The unit, shown herewith, will straighten tubes up to 6-inch with ¼-inch wall, and 4-inch bar of average elastic limit. When the rolls are set to suit the stock to be straightened the bars may be entered



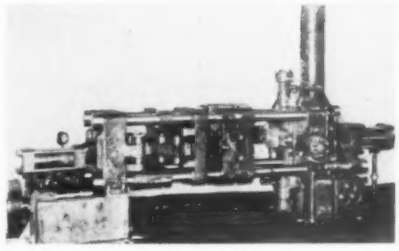
Sutton high-speed tube and bar straightening machine

as rapidly as the speed of the machine will permit, making a continuous straightening process. The machine is designed for straightening all grades and carbons of plain or alloy steels both in the annealed and heat treated condition, including high speed tool steels, etc., and also bars and tubes of other metals. Bars not only are straightened, but scale is cleaned off and all rolling strains are removed.

• • •

Brass Die Casting Machines—

Reed-Prentice Corp., Worcester, Mass., recently brought out high-pressure brass die casting machines designated 2G and 8G. These units are fully hydraulic with two levers controlling operation. Controls are interlocked so that it is impossible



Reed-Prentice brass die casting machine designated 8G

to operate the metal plunger cylinder until the dies are securely closed. A safety pilot valve mechanism eliminates the danger of shooting metal when the dies are open. Dies can be provided for automatic ejection of castings. Die plates are finished on all four sides to provide for core pulling attachments. The 2G machine has a maximum die space of 24 inches and a minimum of 8 inches, while the 8G unit, shown herewith, has a maximum die space of 17 inches.

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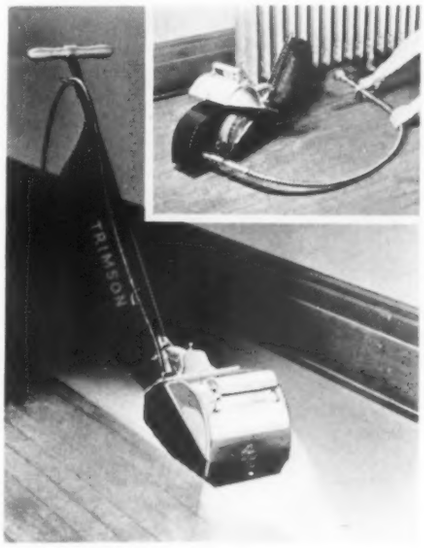
Sander—

Trimson Mfg. Co., 5713 Euclid avenue, Cleveland, is introducing a sander that embodies numerous features including built-in lighting, cen-



The new Trimson sanding machine

tralized control panel, cutting depth adjustment, shaped handle for bench use and "one hand" carrying, etc. In the accompanying illustration the unit is shown in use as a floor sander and also with the packaged power unit attached which converts the sander into a machine for grinding, buffing, polishing, drilling, cutting and cleaning operations. By detaching the floor handle and substituting a hand grip the sander can be adapted to bench work, the reflector housing of the light serving as a hand grip.

• • •

Welding Stud—

Parker-Kalon Corp., 200 Varick street, New York, is marketing a hardened metallic drive screw welding stud that has been developed to

Hardened metallic welding stud developed by Parker-Kalon Corp.

simplify the "studding" procedure in welding cast iron to steel, repairing breaks in castings such as gears, welding cast iron, or other work requiring studs. This new device, shown herewith, forms a thread in cast iron or steel as it is hammered into a plain drilled hole. It is said that the device holds more securely than an ordinary stud in a tapped hole. While it is a recent development, the hardened metallic welding stud is an adaptation of the hardened metallic drive screw which is used widely by the metal working industry to eliminate tapping in assembly work.

• • •

Hydromatic Welding Unit—

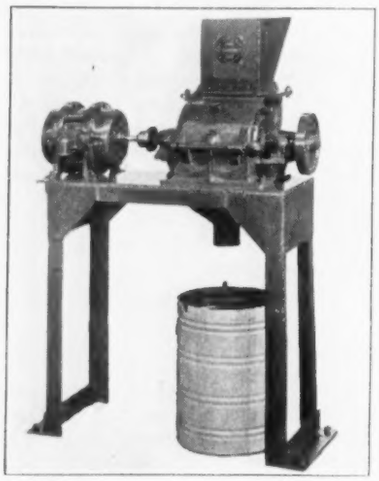
Roth Welding Engineering Co. Inc., 1165 Harper avenue, Detroit, is announcing an improvement in its hydromatic welding method. It combines the company's hydromatic welder with the feature of synchron-

ous control of the welding circuit. The new machine is simpler in design, more adaptable to general production and foolproof, the manufacturer declares.

• • •

Laboratory Hammer Mill—

American Pulverizer Co., 1249 Macklind avenue, St. Louis, is building a hammer mill designed to meet the everyday requirements of the laboratory. The accompanying illustration depicts a 9 by 9 unit direct-connected to a motor and mounted on a structural steel stand. It will



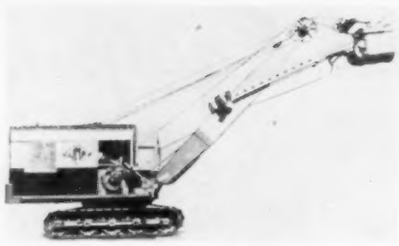
American laboratory hammer mill

crush or pulverize tons of materials and yet occupies no more space than an ordinary office desk, the manufacturer asserts. Construction is rugged—housings are reinforced with ribs wherever crushing strains are greatest. A split housing or frame insures quick accessibility and facilitates cleaning. Rotor or cylinder consists of a heavy main shaft of alloy steel, cast steel end disks and manganese steel rings or hammers. The screen plate slides in grooves in the lower side housings, type and size of screen opening depending, of course, on the application.

• • •

Combination Shovel, Dragline And Crane—

Lima Locomotive Works Inc., Shovel & Crane division, Lima, O., has added to its line a new type 901 2¼-yard convertible shovel, dragline and crane. This unit, shown herewith, has an all-steel cab with two-thirds of its area readily opened for ventilation. The rotating frame upon which the operating machinery and power unit are mounted is a one-piece steel casting. Drums are extra large in diameter and wide enough to carry the maximum amount of cable without double wrapping when the machine is operating as a crane



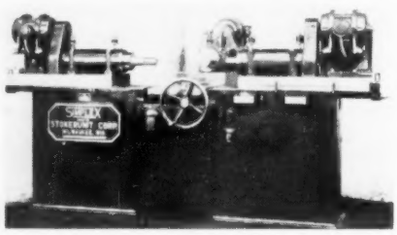
Lima 2¼-yard convertible shovel, dragline and crane

on high lift work. All major motions are independent, making it possible to hoist, swing, travel and raise or lower the boom at the same time. Crawlers are designed so that they can be extended in length when greater bearing surface is desired.

• • •

Boring Machine—

Stokerunit Corp., 5325 West Rogers street, Milwaukee, is offering a new machine that provides for precision boring of several holes on different faces of a part simultaneously. For the manual cycle, platens are brought to the work by a handwheel and at the start of the cut a limit



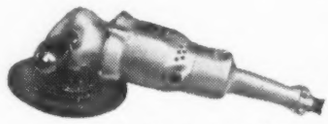
Stokerunit simplex precision unit boring machine

switch stops the feed at the end of the cut. The platens are returned to starting position by the handwheel. In the automatic cycle an electrical control operates a traverse motor which advances the platens to the feeding position and also returns them after the cut, thus establishing full automatic control. Each platen has individual adjustment in relation to the work, but normally all feed at the same rate. Spindle speeds can be arranged to meet requirements.

• • •

Portable Sanders—

Black & Decker Mfg. Corp., Towson, Md., is announcing a completely redesigned line of portable sanders, one of which is shown herewith. Power has been increased and the housing restyled, reducing both size and weight. New dust-proof construction eliminates wear. On the heavy-



Black & Decker sander

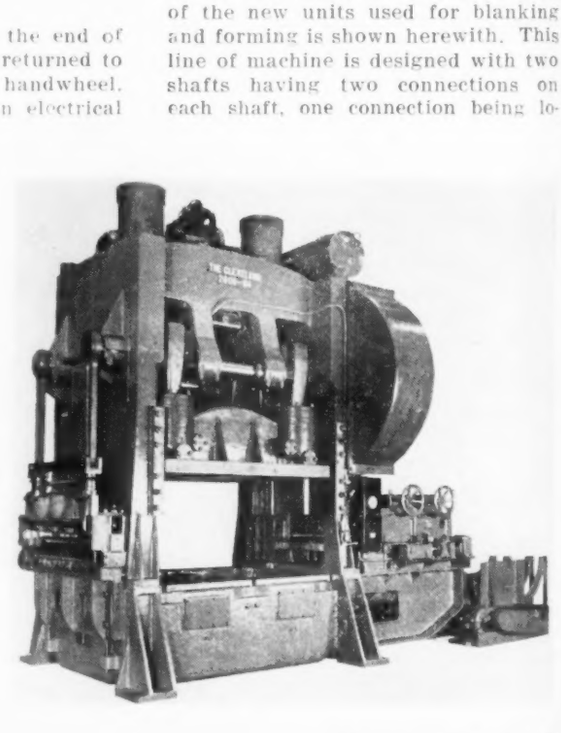
duty and super-service models the commutator and brush compartment is air-sealed and the switches are dust-proof. Grease and labyrinth seals eliminate dust and grit from gears and bearings. New slot type exhaust ports replace the holes formerly employed and appreciably reduce clogging and the danger of overheating the motor.

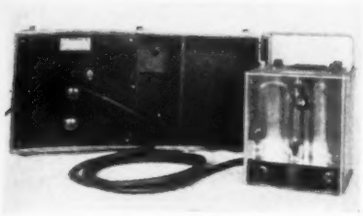
• • •

Four-Point Suspension Press—

Cleveland Punch & Shear Works Co., Cleveland, recently brought out a four-point suspension press which can be furnished in any size. One of the new units used for blanking and forming is shown herewith. This line of machine is designed with two shafts having two connections on each shaft, one connection being lo-

THIS Cleveland power press is arranged with electrically-controlled air-operated friction clutch and brake and is equipped with self-contained pneumatic draw cushions in the bed. The air supply for all the air-operated units is furnished by a compressor on the top of the press

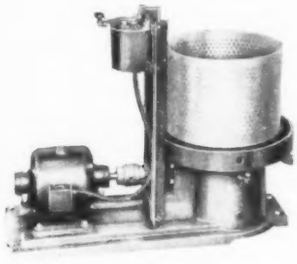




Westinghouse portable stroboscope

cated at approximately each corner of the slide. The arrangement of the connections, in conjunction with extra long gibs and other features, maintains alignment between the slide and the bed whether the work is in the center or off center.

The press is equipped with a double roll feed having supplementary rolls for leveling or straightening the material before it reaches the dies, and is arranged with an automatic uncoiler. A scrap cutter



New Mercil type centrifugal dryer

is provided on the opposite side of the press for shearing off the waste after the piece is blanked or formed. Feed arrangement and press operation are synchronized through an interlocking system so that in the event the correct amount of material has not been fed the predetermined distance into the machine, the ram will stop instantly and remain stopped until correction is made and the operator starts the press again. While the rolls on this machine are arranged to feed 6-inch minimum and 60-inch maximum, rolls can be furnished to feed any length or width depending on size of machine and operation.

• • •

High-Intensity Stroboscope—

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., is marketing a new portable stroboscope, shown herewith. The principle field of application is in connection with vibration analysis of rotating and reciprocating apparatus. It may be used for measurement of approximate rotational speeds of machine, although it is not intended for this application. By means of the apparatus objects having recurrent periodic motions may be made to appear at rest or may be made to trace their prescribed course in either a forward or backward direction at any desired reduction in speed. "Persistence of vision" results in an image free from flickering at rates of 1000 per minute and above.

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Centrifugal Dryer—

Hanson-Van Winkle-Munning Co., Matawan, N. J., is offering a centrifugal dryer, the features of which include compactness, efficiency and speed in the drying of basket loads of plated work. Available in two dryer shell sizes, 12 by 12 inches and 18 by 18 inches, this unit is particularly well adapted for use in conjunction with plating barrels since the small floor space required permits it to be placed close to the barrel. Transfer of the work is a simple operation and pieces to be dried may be placed directly into the perforated shell or in a separate basket which fits the shell. A ½ horsepower motor drives the turntable at 600 revolutions per minute. A conveniently located reversing switch allows the operator to control the direction of rotation at will. The unit is shown at left.

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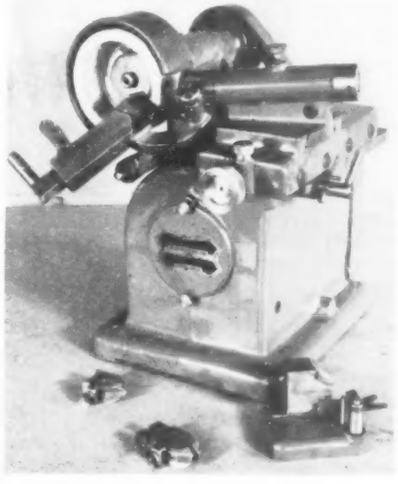
Drill Grinder—

Oliver Instrument Co., Adrian, Mich., is announcing a No. 21 drill grinder which consists of a base containing the motor and supporting a grinding wheel bearing and a carriage. The jig employed embodies a pair of jaws in which the drill can



Oliver No. 21 drill grinder

be clamped, and is entirely independent of the machine. A gage is provided for setting the drill in the jig. After the drill is set it is placed in a holding fixture and one lip ground. The jig then is reversed for grinding the second lip. Drills can be ground with various point angles from 80 to 180 degrees, and shoulder drills may be ground on the shoulder as well as on the point. Capacity of the machine, shown herewith, is 3/32 to ½-inch drills; however, by means of a collet holder drills from 3/32 to No. 57 also may be ground. Moreover, the unit may be arranged to grind left-hand drills; also the thick web type of oil hole drills for crankshaft drilling.

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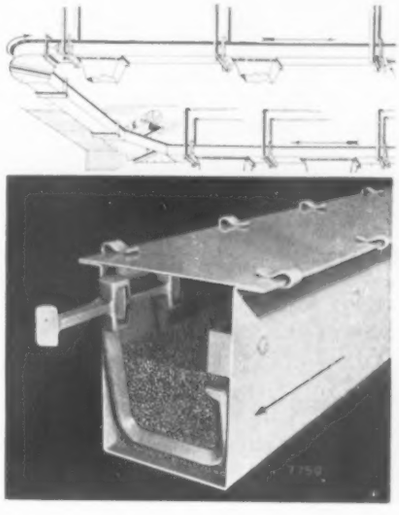
Conveyor—

Stephens-Adamson Mfg. Co., Aurora, Ill., recently developed a "runaround" conveyor for carrying a continuous column of bulk material in several directions and around hori-



Stephens-Adamson "runaround" conveyor handles bulk materials

zontal curves. The system also permits discharge at any point and returns any surplus back to the feed point for recirculation. The conveyor operates on the patented Redler principle by which dry, free-flowing materials such as coal, chemicals, etc., are caused to flow in a solid, undisturbed column through an enclosed steel casing. As shown herewith, a series of skeleton flights, closely spaced on a light conveyor chain, floats completely embedded in the material.

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New Line of V-Belts—

B. F. Goodrich Co., Akron, O., is offering V-belts in a complete line for both multiple and single drives. Two styles are available. One is of single strand construction especially designed to withstand flexing and stretching on small pulley, short center, high-speed drives. For larger drives, a stronger belt of laminated construction and with a greater number of cords and several layers of stiffening fabric is available.

New Trade Publications

Diesel Engines—Caterpillar Tractor Co., Peoria, Ill. A booklet on the "Whys and Hows of Diesel Engines."

Plating Barrels—Udylite Co., Detroit. A bulletin describing its product designed for operation in alkaline plating baths, listing advantages and various features of construction.

Optical Instruments — Gaertner Scientific Corp., Chicago. An 80-page catalog L-2, with data on spectrometers, spectroscopes, spectrographs, polariscopes, interferometers, light sources and accessories.

Turbines — General Electric Co., Schenectady, N. Y. Booklet GEA-1145C relating the features, types, applications, and construction of its steam turbines for the mechanical drive of pumps, fans, blowers, pulverizers and paper machines.

Ball Bearings—Hoover Steel Ball Co., Ann Arbor, Mich. Bulletin No. 6 on the subject of lubrication, with a comprehensive list of recommended greases for ball bearings, including general specifications.

Machine Shop Training — Allied Screw Machine Co. Inc., 609 West Lake street, Chicago. A booklet covering the practical machine shop training school offered by this company.

Generator Sets—Caterpillar Tractor Co., Peoria, Ill. A booklet, form 3105, presenting available material on its generator sets in three sizes, with consolidated dimensions and specifications for each size.

Machine Specialties — Continental Machine Specialties Inc., 1301 Washington avenue south, Minneapolis. A booklet containing statements from 15 companies concerning their experiences with the products of the firm.

Resistance Alloys—C. O. Jelliff Mfg. Corp., Southport, Conn. A bulletin describing the Kanthal high temperature resistance alloys, A, A-1, and D, with details concerning uses and characteristics of each.

Gaskets—Goetze Gasket & Packing Co. Inc., New Brunswick, N. J. Catalog No. 48, discussing gaskets produced by this company for a wide range of industrial uses, including information on packings for stuffing boxes.

Polishing and Sanding—Pratt & Whitney Co., Hartford, Conn. Circular S-454 displaying and giving specifications for Keller expanding rubber polishing wheels, sanding drums, and abrasive belts and sleeves. Illustrations and prices.

Switchboards — Laganke Electric Co., Cleveland. A bulletin illustrating direct and alternating current switchboards, battery charging, dead front circuit breaker, 2300-volt switchboards, with photographs and suggestions of other products.

Chaplets—Angell Nail & Chaplet Co., 4580 East Seventy-first street, Cleveland. A folder illustrating and describing its new pressure-proof stem, double head chaplet, with heavy-groove stem, center sealing band, and head welded to the stem.

Accounting—Metropolitan Life Insurance Co., 1 Madison avenue, New York. A report entitled "Accounting for Plant and Equipment," setting forth the results of a survey of the experience and practice of 46 companies in diversified lines of business.

Sheaves—Allis-Chalmers Mfg. Co., Milwaukee. Bulletin 2188A, providing data on duro brace texsteel sheaves for stock drives up to 15 horsepower with dimension tables, horsepower and center distance tables for stock speed ratios, and price list tables of these 2 to 6 groove products.

Compressors — Ingersoll-Rand Co., 11 Broadway, New York. A 35-page booklet presenting its line of power-driven, horizontal duplex, double acting, crosshead type, moderate speed, heavy duty compressors; in capacities from 50 to 250 horsepower for single or multi-stage compression.

Vapor Lamps—Benjamin Electric Mfg. Co., Des Plaines, Ill. Supplement section XI-A to catalog No. 26, setting forth data on its new 400-watt high intensity mercury vapor lamp, including operation, color combination and advantages, with various fixtures, installations, and dimensions.

Laboratory Apparatus—Harold E. Trent Co., 618-640 North Fifty-fourth street, Philadelphia. Leaflet TD-23, emphasizing electrical hot plates, round, square and rectangular, with renewable units, and laboratory furnaces, crucible, horizontal and muffle types.

Dust Collectors—Claude B. Schneible, 4755 North Crawford avenue, Chicago. A bulletin on a multi-wash dust collector designed for suppressing dust in general atmospheres, from the foundry shakeout, the sand blast, tumbling mills, grinding wheels, and aeration plants.

Tools—Ampco Metal Inc., Milwaukee. Data sheet No. 24, with photographs and description of drilling machinery and parts produced by this company and used by the Cleereman Machine Tool Co., Green Bay, Wis., including comment on the features of Ampco metal.

Flux—Mathieson Alkali Works, 60 East Forty-second street, New York. A booklet entitled "Purite's Place in Foundry Practice," explaining the action of Purite in the cupola and methods of using, action in the forehearth, and methods of application in the forehearth or teapot ladle.

Grinders—Vonnegut Moulder Corp., 1803 Madison avenue, Indianapolis. A folder describing heavy duty floor stands, buffers, and swing frame grinders, including wheels ranging from 10 to 30 inches in diameter with constant and multi-speed alternating current and variable-speed direct current motors from 1 to 25 horsepower.

Pumps—Worthington Pump & Machinery Corp., Harrison, N. J. A bulletin W-450-B27, presenting vertical turbine type pumps for deep well, drainage, irrigation, etc., with a cross-section view in colors showing details of construction, with photographs of installations. Another bulletin W-101-B2A, covering the company's horizontal duplex piston pumps, type VA.

Future Trends Reflected in Increasing Use of Nickel

(*Concluded from Page 40*)

including preliminary applications in lighter weight construction of rolling stock. Both the Canadian Pacific and the Canadian National railroads are using nickel steel forgings on steam locomotives, and progress has been made in the application of low-carbon, nickel steel forgings in electric locomotives. It is reasonable to believe that, as soon as a favorable adjustment is made in the economic structure of the railroads, the industry may become a large user of nickel alloy steel castings.

Correlated with the adoption of cast iron crankshafts for diesel engines is the fact that cast iron with tensile strength up to 70,000 pounds per square inch and with a higher hardness necessary for improved wear resistance and bearing qualifications, is being produced regularly at an increasing number of gray iron foundries.

Producers of machine tools and other heavy machinery have recognized the value in terms of strength, toughness, stiffness and wear resistance of high-test nickel alloyed irons for parts of their equipment. The greater stiffness of alloy cast iron plus its damping quality, or capacity to absorb vibrations, enable the machine builder to help answer the requirements of greater production accuracy.

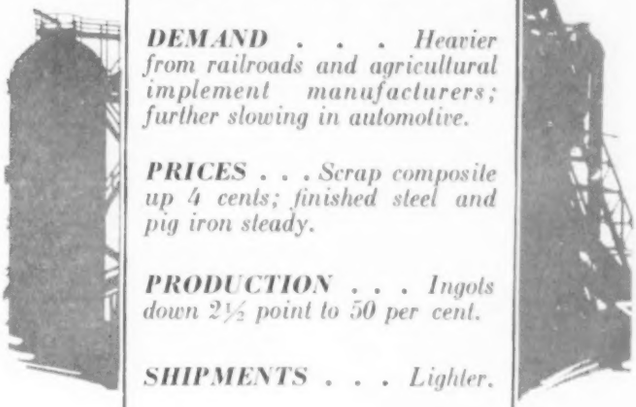
Progress has been made in the adoption of Invar-type nickel cast iron (30-40 per cent nickel) for certain types of dies which are heated during operation.

The potentialities of alloy steels for hand tools and similar common applications are reflected in the number of tools of this type now available in heat treated nickel alloy steels.

In the metal industries as a whole, machine frames and dies of cast or heat treated alloy iron are now commonly employed where such properties as strength, hardness and resistance to deformation are essential. The greater strength of the chilled cast material permits its use for heavy reductions and wide surface sheets.

Railroad Buying Softens Loss of Automotive

Implement Demand Gains; Drop in Steel Rate Held To 2½ Points; Scrap Up



MARKET IN TABLOID

DEMAND . . . *Heavier from railroads and agricultural implement manufacturers; further slowing in automotive.*

PRICES . . . *Scrap composite up 4 cents; finished steel and pig iron steady.*

PRODUCTION . . . *Ingots down 2½ point to 50 per cent.*

SHIPMENTS . . . *Lighter.*

INCREASING steel commitments by railroads and agricultural implement manufacturers are taking up much of the slack caused by a progressive decline in automobile production, holding the loss in steelworks operations last week to 2½ points, at 50 per cent.

Already heavy tonnages have been placed by the carriers for cars and car repair material, and in the past week new inquiries for rails and equipment, in terms of steel, were 46 per cent larger than in any other week in 12 months.

Most of the 115,000 tons for Pennsylvania's new car and rebuilding program has been allocated. For Chesapeake & Ohio car repairs 7000 tons has been awarded. Chicago, Burlington & Quincy has started work on rehabilitating a second group of 500 freight cars, and also has placed two more 10-car Zephyr trains, taking 300 tons of stainless steel sheets, one of the largest single orders for this material.

Erie railroad is planning early purchase of 500 to 1000 freight cars and 18,000 tons of rails. Lehigh Valley will build 1000 50-ton coal cars in its shops. Pacific Fruit Express is in the market for 3000 refrigerator cars. Chicago & North Western has awarded 16,000 tons of rails.

Federal loans have been approved by the interstate commerce commission for several large railroad purchases, including 35,000 tons of rails for New York Central. Missouri Pacific has been authorized to spend $6,000,000 on rails and equipment.

Agricultural implement manufacturers have increased production schedules to fill orders from dealers, who do not wish to be caught short for the spring trade, as they were last year. Steel demand from machine tool builders is well sustained. Two national expositions of steel-made equipment and products—road building, and containers—last week reflected strong markets this year. Road builders count on a billion-dollar expenditure for highway improvements, calling for more structural and reinforcing steel than in 1935.

Competition from tin containers is driving some glassmakers into acquiring facilities for making such containers. Owens-Illinois Glass Co. has purchased two large plants for this purpose.

Midwinter finds practically no recession in structural shape awards from the general averages of last summer. Shape awards last week totaled 26,155 tons, including 4250 tons for a group of buildings for Fisher Body Corp., Grand Rapids, Mich. Los Angeles placed 6661 tons of reinforcing bars for the Colorado river aqueduct. American Liberty Pipe Line Co. is reported to have awarded about 6000 tons of 8-inch steel pipe for a line in Texas.

Meanwhile, the lull in automobile production is believed to be only temporary. Output last week was down 7700 units to 87,400. By the end of this month 1,400,000 new models will have been built since their introduction last October. By contrast, in the first four months of new model introductions in the spring of 1935 output was only slightly more than 1,200,000.

February is expected to see a further decline of 10 to 15 per cent in assemblies. Some of the leading manufacturers have definitely increased schedules for castings next month, indicating a similar trend in assemblies a month later.

Scrap prices again seem to be moving in reverse order to the general trend of steel demand, just as they did last year preceding the time when steel output embarked on a five-months steady climb. STEEL's scrap composite rose for the second consecutive week, 4 cents to $13.21. The iron and steel composite also advanced 4 cents to $33.38, while the finished steel index remained $53.70.

Pittsburgh district steelworks operations last week were down 3½ points to 37½ per cent; Buffalo 15 to 30; eastern Pennsylvania ½-point to 36½; New England 10 to 83; Youngstown 3 to 61. Wheeling was up 2 to 70; Birmingham 10 to 51; Chicago ½-point to 53, while others were unchanged.

COMPOSITE MARKET AVERAGES

	Jan. 25	Jan. 18	Jan. 11	One Month Ago Dec., 1935	Three Months Ago Oct., 1935	One Year Ago Jan., 1935	Five Years Ago Jan., 1931
Iron and Steel	$33.38	$33.34	$33.33	$33.31	$32.84	$32.58	$31.69
Finished Steel	53.70	53.70	53.70	53.70	53.70	54.00	49.30
Steelworks Scrap	13.21	13.17	13.12	13.17	12.72	12.03	10.49

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

	Jan. 25, 1936	Dec. 1935	Oct. 1935	Jan. 1935
Finished Material				
Steel bars, Pittsburgh	1.85c	1.85	1.85	1.80
Steel bars, Chicago	1.90	1.90	1.90	1.85
Steel bars, Philadelphia	2.16	2.16	2.16	2.09
Iron bars, Terre Haute, Ind.	1.75	1.75	1.75	1.75
Shapes, Pittsburgh	1.80	1.80	1.80	1.80
Shapes, Philadelphia	2.01½	2.01½	2.01½	2.00½
Shapes, Chicago	1.85	1.85	1.85	1.85
Tank plates, Pittsburgh	1.80	1.80	1.80	1.80
Tank plates, Philadelphia	2.00	1.99	1.99	1.98½
Tank plates, Chicago	1.85	1.85	1.85	1.85
Sheets, No. 10, hot rolled, Pitts.	1.85	1.85	1.85	1.85
Sheets, No. 24, hot ann., Pitts.	2.40	2.40	2.40	2.40
Sheets, No. 24, galv., Pitts.	3.10	3.10	3.10	3.10
Sheets, No. 10, hot rolled, Gary	1.95	1.95	1.95	1.95
Sheets, No. 24, hot anneal., Gary	2.50	2.50	2.50	2.50
Sheets, No. 24, galvan., Gary	3.20	3.20	3.20	3.20
Plain wire, Pittsburgh	2.30	2.30	2.30	2.30
Tin plate, per base box, Pitts.	5.25	5.25	5.25	5.25
Wire nails, Pitts	2.40	2.40	2.40	2.60
Semifinished Material				
Sheet bars, open-hearth, Youngs.	$30.00	30.00	28.00	28.00
Sheet bars, open-hearth, Pitts.	30.00	30.00	28.00	28.00
Billets, open-hearth, Pittsburgh	29.00	29.00	27.00	27.00
Wire rods, Pittsburgh	40.00	40.00	38.00	38.00

	Jan. 25, 1936	Dec. 1935	Oct. 1935	Jan. 1935
Pig Iron				
Bessemer, del. Pitts.	$20.8132	$20.8132	$19.8132	$19.76
Basic, Valley	19.00	19.00	18.00	18.00
Basic, eastern, del. eastern Pa.	20.8132	20.8132	19.8132	19.76
No. 2 fdry., del. Pitts.	20.3132	20.3132	19.3132	19.26
No. 2 fdry., Chicago	19.50	19.50	18.75	18.50
Southern No. 2, Birm.	15.50	15.50	14.50	14.50
Southern No. 2 del. Cincinnati	20.2007	20.2007	19.2007	19.13
No. 2X eastern, del. Phila.	21.6882	21.6882	20.6882	20.63
Malleable, Valley	19.50	19.50	18.50	18.50
Malleable, Chicago	19.50	19.50	18.75	18.50
Lake Sup. charcoal, del. Chi.	25.2528	25.2528	24.8728	24.04
Ferromanganese, del. Pitts.	90.13	90.13	90.13	89.79
Gray forge, del. Pitts.	19.6741	19.6741	18.6741	18.63
Scrap				
Heavy melting steel, Pittsburgh	$14.50	14.05	13.65	13.50
Heavy melt. steel, No. 2, east Pa.	11.50	11.25	11.00	9.71
Heavy melting steel, Chicago	13.50	13.35	12.50	12.15
Rails for rolling, Chicago	14.25	14.50	14.00	12.90
Railroad steel specialties, Chicago	14.75	14.25	13.50	13.40
Coke				
Connellsville, furnace, ovens	$3.50	3.55	3.55	3.60
Connellsville, foundry, ovens	4.00	4.10	4.35	4.60
Chicago, by-product foundry, del.	9.75	9.75	9.75	9.25

Steel, Iron, Raw Material, Fuel and Metals Prices

Except when otherwise designated, prices are base, f.o.b. cars. Asterisk denotes price change this week

Sheet Steel

Hot Rolled No. 10, 24-48 in.

Pittsburgh	1.85c
Gary	1.95c
Chicago, delivered	1.98c
New York, del.	2.20c
Philadelphia, del.	2.16c
Birmingham	2.00c
St. Louis, del.	2.18c
Pacific ports, f.o.b. cars, dock	2.40c

Hot Rolled Annealed No. 24

Pittsburgh	2.40c
Gary	2.50c
Chicago, delivered	2.53c
Detroit, delivered	2.45c-2.60c
New York, del.	2.75c
Philadelphia, del.	2.71c
Birmingham	2.55c
St. Louis, del.	2.72c
Pacific ports, f.o.b. cars, dock	3.05c

Galvanized No. 24

Pittsburgh	3.10c
Gary	3.20c
Chicago, delivered	3.23c
Philadelphia, del.	3.41c
New York, del.	3.45c
Birmingham	3.25c
St. Louis, del.	3.43c
Pacific ports, f.o.b. cars, dock	3.70c

Tin Mill Black No. 28

Pittsburgh	2.75c
Gary	2.85c
St. Louis, delivered	3.08c

Cold Rolled No. 10

Pittsburgh	2.50c
Gary	2.60c
Detroit, delivered	2.55c-2.70c
Philadelphia, del.	2.81c
New York, del.	2.85c
Pacific ports, f.o.b. cars, dock	3.10c

Cold Rolled No. 20

Pittsburgh	2.95c
Gary	3.05c
Detroit, delivered	3.00c-3.15c
Philadelphia, del.	3.26c
New York, del.	3.30c

Enameling Sheets

Pittsburgh, No. 10	2.50c
Pittsburgh, No. 20	3.10c
Gary, No. 10	2.60c
Gary, No. 20	3.20c

Tin and Terne Plate

Gary base, 10 cents higher.

Tin plate, coke base (box) Pittsburgh	$5.25
Do., waste-waste	2.75c
Do., strips	2.50c
Long ternes, No. 24 unassorted, Pitts.	3.40c
Do., Gary	3.50c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	23.00	24.00
Plates	26.00	28.00
Sheets	33.00	35.00
Hot strip	20.75	22.75
Cold strip	27.00	29.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	17.00	18.50	21.00	26.00
Plates	20.00	21.50	24.00	29.00
Sheets	25.00	28.00	31.00	35.00
Hot strip	15.75	16.75	21.75	26.75
Cold stp.	20.50	22.00	27.00	35.00

Steel Plates

Pittsburgh	1.80c
New York, del.	2.09c
Philadelphia, del.	1.99c
Boston, delivered	2.22c
Buffalo, delivered	2.05c
Chicago or Gary	1.85c
Cleveland, del.	1.99½c
Birmingham	1.95c
Coatesville, base	1.90c
Sparrows Pt., base	1.90c
Pacific ports, f.o.b. cars, dock	2.35c
St. Louis, delivered	2.08c

Structural Shapes

Pittsburgh	1.80c
Philadelphia, del.	2.01½c
New York, del.	2.06½c
Boston, delivered	2.20½c
Bethlehem	1.90c
Chicago	1.85c
Cleveland, del.	2.00c
Buffalo	1.90c
Gulf Ports	2.20c
Birmingham	1.95c
Pacific ports, f.o.b. cars, dock	2.35c

Bars

Soft Steel

(Base, 5 to 25 tons)

Pittsburgh	1.85c
Chicago or Gary	1.90c
Duluth	2.00c
Birmingham	2.00c
Cleveland	1.90c
Buffalo	1.95c
Detroit, delivered	2.00c
Pacific ports, f.o.b. cars, dock	2.40c
Philadelphia, del.	2.16c
Boston, delivered	2.27c
New York, del.	2.20c
Pitts., forg. qual.	2.10c

Rail Steel

To Manufacturing Trade

Pittsburgh	1.70c
Chicago or Gary	1.75c
Moline, Ill.	1.75c
Cleveland	1.75c
Buffalo	1.80c

Iron

Troy, N. Y.	1.70c
Terre Haute, Ind.	1.75c
Chicago	1.80c
Philadelphia	2.06c
Pittsburgh, refined	2.75-7.50c

Reinforcing

New billet, straight lengths, quoted by distributors.

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young.	2.10c
Gulf ports	2.45c
Pacific coast ports f.o.b. cars dock	2.45c
Philadelphia, del.	2.11c-2.16c

Rail steel, straight lengths, quoted by distributors

Pittsburgh	1.90c
Chicago, Buffalo, Cleveland, Birm., Young.	1.95c
Gulf ports	2.30c

Wire Products

Wire Products
(Prices apply to straight or mixed carloads; less carloads $4 higher; less carloads fencing $5 over base column.)

Base Pitts.-Cleve. 100 lb. keg.	
Standard wire nails	$2.40
Cement coated nails	2.40
Galvanized nails, 15 gage and coarser	4.40
do. finer than 15 gage	4.90

(Per pound)

Polished staples	3.10c
Galvanized fence staples	3.35c
Barbed wire, galv.	2.80c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$61.00

To Manufacturing Trade

Plain wire, 6-9 gage	2.30c

Anderson, Ind. (merchant products only) and Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire, Pittsburgh or Cleveland	2.90c

Do., Chicago up $1, Worcester, $2.

Cold-Finished Carbon Bars and Shafting

Base, Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs.	2.10c
20,000 to 59,999 lbs.	2.05c
60,000 to 99,999 lbs.	2.00c
100,000 lbs. and over	1.97½c

Gary, Ind., Cleve., Chi., up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Alloy Steel Bars (Hot)

Pittsburgh, Buffalo, Chicago, Massilon, Canton, Bethlehem 2.45c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 0.50
4600 0.20 to 0.30 Mo. 1.25-1.75 Ni. 1.05
5100 0.80-1.10 Cr. 0.45
5100 Cr. spring base
6100 bars 1.20
6100 spring 0.70
Cr., Ni., Van. 1.50
Carbon Van. 0.95
9250 carbon base plus extras

Piling

Pittsburgh	2.15c
Chicago, Buffalo	2.25c

Strip and Hoops

Hot strip to 23⅛-in. Pittsburgh	1.85c
Chicago or Gary	1.95c
Birmingham base	2.00c
Detroit, delivered	2.05c
Philadelphia, del.	2.16c
New York, del.	2.20c
Cooperage hoop, Pittsburgh	1.95c
Chicago	2.05c
Cold-strip, Pitts. Cleve.	2.60c
Detroit, del.	2.65c
Worcester, Mass.	2.80c

Rails, Track Material

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts. 20-45 lbs.	$28.00
45-50 lbs.	$25.00
50-60 lbs.	$26.00
70-75 lbs.	$24.50
80-90 lbs.	$26.00
100 lbs.	$27.00
Light rails, billet qual. Pitts., Chi.	$35.00
Do., reroll, qual.	34.00
Angle bars, billet, Gary, Ind., So. Chi.	2.55c
Do., axle steel	2.10c
Spikes, R. R. base	2.60c
Track bolts, base	3.60c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $2; 16 and 20 lbs., up $1; 12 lbs. up $2; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots, Dec. 1, 1932, lists, 10% extra for less full containers.

Carriage and Machine

½ x 6 and smaller	70-10-5 off
Do. larger	70-10 off
Tire bolts	55 off

Plow Bolts

All sizes	70-10 off

Stove Bolts

In packages with nuts attached 72½-10 off; in packages with nuts separate 72½-10-5 off; in bulk 82½ off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	65-5 off
Elevator bolts	65-5 off

Nuts

S. A. E. semifinished hex.: ½ to ⅞-inch	60-20-15 off
Do., ½ to 1-inch	60-20-15 off
Do., over 1-inch	60-20-15 off

Hexagon Cap Screws

Milled	80-10-10 off
Upset, 1-in., smaller	85 off

Square Head Set Screws

Upset, 1-in., smaller	75-10 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	2.90c
Struc., c. l., Chicago	3.00c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila., to jobbers & large nut, bolt mfrs.	$6.25 off

Cut Nails

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more, no discount on size extras	$3.05
Do., under 5 kegs; no disc. on size extras	$3.20

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ points less. Wrought pipe, Pittsburgh.

Butt Weld

In.	Blk.	Galv.
Steel		
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55
Iron		
½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

Lap Weld

Steel		
2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½
Iron		
2	37	22½
2½—3½	38	25
4—8	40	28½

Line Pipe

Steel	
½, butt weld	57½
⅛-inch butt weld	50½
¼—⅜, butt weld	52½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63
Iron	
⅛—1½ inch, black and galv. take 4 pts. over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe lists, 8—12-inch, no extra.	

Boiler Tubes

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		Charcoal Iron	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¼—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 200 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 lbs., 2 points under base.

Seamless Boiler Tubes

Under date of May 15 in lots of 40,000 pounds or more for cold-drawn boiler tubes and in lots or 40,000 pounds or feet or more for hot-finished boiler tubes, revised prices are quoted for 55 cold-drawn boiler tube sizes ranging from ¼ to 6-inch outside diameter in 30 wall thicknesses, decimal equivalent from 0.035 to 1.000, on a dollars and cents basis per 100 feet and per pound. Less-carloads revised as of July 1, 1935, card.

Hot-finished carbon steel boiler tube prices also under date of May 15 range from 1 through 7 inches outside diameter, inclusive, and embrace 47 size classifications in 22 decimal wall thicknesses ranging from 0.109 to 1.000, prices also being on a lb. and 100 ft. basis.

Seamless Tubing

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$39.00-40.00
4-in., Birmingham	42.00-43.00
4-in., Chicago	50.40-51.40
6 to 24-in. Chicago	47.40-48.40
6-in. & over, east. fdy.	43.00
Do., 4-in.	46.00

Class A pipe $3 over Class B
Stnd. fittgs., Birm. base $100.00

Semifinished Steel

Billets and Blooms

4 x 4-inch base; gross ton

Pitts., Chi., Cleve., and Youngstown	$29.00
Philadelphia	34.67
Duluth	31.00

Forging Billets

6 x 6 to 9 x 9-in., base

Pitts., Chi., Buff.	35.00
Forging, Duluth	37.00

Sheet Bars

Pitts., Cleve., Young., Chi., Buff., Canton, Sparrows Pt.	30.00

Slabs

Pitts., Chi., Cleve., Young.	29.00

Wire Rods

(Common; combination up $2)

Pitts., Cleveland	40.00
Chicago	41.00
Worcester, Mass.	42.00

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Point	1.80c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.50- 3.65
Connellsville, fdry.	4.00- 4.25
Connel., prem. fdry.	5.50- 5.75
New River fdry.	6.00
Wise county fdry.	4.45- 5.00
Wise county fur.	4.00- 4.50

By-Product Foundry

Newark, N. J., del.	9.70-10.15
Chi., ov., outside del.	9.00
Chicago, del.	9.75
New England, del.	11.50
St. Louis, del.	10.00
Birmingham, ovens	6.50
Indianapolis, del.	9.40
Cincinnati, del.	9.50
Cleveland, del.	9.75
Buffalo, ovens	7.50- 8.00
Detroit, ov., out. del.	9.00
Philadelphia, del.	9.38

Coke By-Products

Per gallon, producers' plants.

	Tank lots	Spot
Pure and 90% benzol	18.00c	
Toluol	30.00c	
Solvent naphtha	30.00c	
Commercial xylol	30.00c	

Per lb. f.o.b. New York.

Phenol (200 lb. drums)	16.30c
Do. (100 lbs.)	17.30c

Eastern Plants, per lb.

Naphthalene flakes and balls, in bbls., to jobbers	6.75c

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.20

†Western prices, ½-cent up.

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25; 50c diff. for each 0.25 below 1.75. Gross tons.

Basing Points:	No. 2 Fdry	Malleable	Basic	Bessemer
Bethlehem, Pa.	$20.50	$21.00	$20.00	$21.50
Birdsboro, Pa.	20.50	21.00	20.00	21.50
Birmingham, Ala., southern del.	15.50	15.50	14.50	21.00
Buffalo	19.50	20.00	18.50	20.50
Chicago	19.50	19.50	19.00	20.00
Cleveland	19.50	19.50	19.00	20.00
Detroit	19.50	19.50	19.00	20.00
Duluth	20.00	20.00	.....	20.50
Erie, Pa.	19.50	20.00	19.00	20.50
Everett, Mass.	20.50	21.00	20.00	21.50
Hamilton, O.	19.50	19.50	19.00	.....
Jackson, O.	20.25	20.25	19.75	.....
Neville Island, Pa.	19.50	19.50	19.00	20.00
Provo, Utah	17.50	.....	17.00	.....
Sharpsville, Pa.	19.50	19.50	19.00	20.00
Sparrows Point, Md.	20.50	.....	20.00	.....
Swedeland, Pa.	20.50	21.00	20.00	21.50
Toledo, O.	19.50	19.50	19.00	20.00
Youngstown, O.	19.50	19.50	19.00	20.00
Delivered from Basing Points:				
Akron, O., from Cleveland	20.76	20.76	26.26	21.26
Baltimore from Birmingham	21.08	.....	19.96	.....
Boston from Birmingham	20.62	.....	20.50	.....
Boston from Everett, Mass.	21.00	21.50	20.50	22.00
Boston from Buffalo	21.00	21.50	20.50	22.00
Brooklyn, N. Y., from Bethlehem	22.93	23.43	.....	.....
Brooklyn, N. Y., from Bmghm.	22.50	.....	.....	.....
Canton, O., from Cleveland	20.76	20.76	20.26	21.26
Chicago from Birmingham	†19.72	.....	19.60	.....
Cincinnati from Hamilton, O.	20.58	20.58	20.08	.....
Cincinnati from Birmingham	20.20	.....	19.20	.....
Cleveland from Birmingham	19.62	.....	19.12	.....
Indianapolis from Hamilton, O.	21.93	21.93	21.43	22.43
Mansfield, O., from Toledo, O.	21.26	21.26	20.76	21.76
Milwaukee from Chicago	20.57	20.57	20.07	21.07
Muskegon, Mich., from Chicago Toledo or Detroit	22.60	22.60	22.10	23.10
Newark, N. J., from Birmingham	21.61	.....	.....	.....
Newark, N. J., from Bethlehem	21.99	22.49	.....	.....
Philadelphia from Birmingham	20.93	.....	20.81	.....
Philadelphia from Swedeland, Pa.	21.31	21.81	20.81	.....
Pittsburgh district from Neville Island	Neville base plus $1.21 switching charges		67c, 81c and	
Saginaw, Mich., from Detroit	21.75	21.75	21.25	21.25

Delivered from Basing Points:	No. 2 Fdry	Malleable	Basic	Bessemer
St. Louis, northern	20.00	20.00	19.50	.....
St. Louis from Birmingham	†19.62	.....	19.50	.....
St. Paul from Duluth	21.94	21.94	.....	22.44

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $24.00, Phila. base, standard and copper bearing, $25.13.

Gray Forge		Charcoal	
Valley furnace	19.00	Lake Superior fur.	$22.00
Pitts. dist. fur.	19.00	Do., del. Chicago	25.25
		Lyles, Tenn.	22.50

Silvery†

Jackson county, O., base; 6-6.50 per cent $22.75; 6.51-7—$23.25; 7-7.50—$23.75; 7.51-8—$24.25; 8-8.50—$24.75; 8.51-9—$25.25; 9-9.50—$25.75. Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon. 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works

Fire Clay Brick

Super Quality

Pa., Mo., Ky. $55.00

First Quality

Pa., Ill., Md., Mo., Ky. $45.00

Alabama, Ga., ... $38.00-45.00

Second Quality

Pa., Ill., Ky., Md., Mo. 40.00

Ga., Ala. 35.00

Ohio

First quality $40.00

Intermediary 37.00

Second quality 28.00

Malleable Bung Brick

All bases 50.00

Silica Brick

Pennsylvania $45.00

Joliet, E. Chicago.... 54.00

Birmingham, Ala.... 52.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)... $45.00

Domestic dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags).. 40.00

Domestic dead - burned gr. net ton f.o.b. Chewelah, Wash. (bulk).. 22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick $45.00

Chemically bonded chrome brick 45.00

Magnesite brick 65.00

Chemically bonded magnesite brick 55.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton $20.00

Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all-rail $16.00

Do., for barge..... $17.50

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid 75.00

Do., Balti. base.... 75.00

Do., del. Pittsb'gh 80.13

Spiegeleisen, 19-20% dom. Palmerton, Pa., spot†..... 26.00

Do., New Orleans 26.00

Ferrosilicon, 50% freight all., cl. 77.50

Do., less carload.. 85.00

Do., 75 per cent.. 126-130.00

Spot, $5 a ton higher.

Silicoman., 2½ carb. 85.00

2% carbon, 90.00; 1%, 100.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del.... 10.00

Ferrotungsten, stand., lb. con. del. 1.35- 1.45

Ferrovanadium, 35 to 40% lb., cont.... 2.70- 2.90

Ferrotitanium, c. l., prod. plant, frt. allow., net ton 137.50

Spot, 1 ton, frt. allow., lb. 7.00

Do., under 1 ton... 7.50

Ferrophosphorus, per ton, c. l., 17-19% Rockdale, Tenn., basis, 18%, $3 unitage 58.50

Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $3 unitage 75.00

Ferromolybdenum, stand. 55-65%, lb. 0.95

Molybdate, lb. cont. 0.80

†Carloads, Quan. diff. apply.

Nonferrous

METAL PRICES OF THE WEEK

Spot unless otherwise specified. Cents per pound

	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: Futures	Lead: New York N. Y.	Lead: East St. L.	Zinc St. L.	Aluminum 99%	Antimony Chinese Spot, N. Y.	Nickel Cathodes
Jan. 18	9.25	9.37½	8.85	47.35	46.20	4.50	4.35	4.85	*19.00	12.62½	35.00
Jan. 20	9.25	9.37½	8.85	46.87½	45.55	4.50	4.35	4.85	*19.00	12.62½	35.00
Jan. 21	9.25	9.37½	8.85	46.87½	45.50	4.50	4.35	4.85	*19.00	12.62½	35.00
Jan. 22	9.25	9.37½	8.85	46.00	44.87½	4.50	4.35	4.85	*19.00	12.62½	35.00
Jan. 23	9.25	9.37½	8.85	46.12½	45.00	4.50	4.35	4.85	*19.00	12.62½	35.00
Jan. 24	9.25	9.37½	8.85	46.35	45.12½	4.50	4.35	4.85	*19.00	12.62½	35.00

*Nominal range 19.00 to 21.00c.

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 9.00c Conn. copper.

Sheets

Yellow brass (high)	14.62½
Copper hot rolled	16.50
Lead cut to jobbers	8.25
Zinc, 100-lb. base....	9.50

Tubes

High yellow brass	16.87½
Seamless copper....	17.00

Rods

High yellow brass....	13.12½
Copper, hot rolled....	13.50

Anodes

Copper untrimmed..	14.00

Wire

Yellow brass (high)	15.12½

OLD METALS

Dealers' buying prices, cents lb.

No. 1 Composition Red Brass

New York	5.75- 6.00
Cleveland	6.37½- 6.50
Chicago	5.75- 6.00
St. Louis	6.00- 6.25

Heavy Copper and Wire

New York, No. 1.....	7.00- 7.25
Chicago, No. 1.....	7.00- 7.25
Cleveland	6.75- 7.00
St. Louis, No. 1.....	7.00- 7.37½

Composition Brass Borings

New York	5.00- 5.25

Light Copper

New York	5.75- 6.00
Chicago	5.50- 5.75
Cleveland	5.87½- 6.00
St. Louis	5.75- 6.00

Light Brass

Chicago	3.37½-3.62½
Cleveland	3.25- 3.50
St. Louis	3.50- 3.75

Lead

New York	3.50- 3.75
Cleveland	3.50- 3.75
Chicago	3.37½-3.62½
St. Louis	3.65- 3.75

Zinc

New York	2.00- 2.25
Cleveland	2.50- 2.75
St. Louis	2.75-3.00

Aluminum

Borings, Cleveland	9.00- 9.50
*Mixed, cast, Cleve.	13.00-13.25
Mixed, cast, St. L....	13.00-13.50
Clips, soft, Cleve....	15.00-15.25

SECONDARY METALS

Brass ingot, 85-5-5-5	9.50
*Stand. No. 12 alum.	17.00-17.50

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	9.50-10.50
Boston, dock, expt.	9.50- 9.75
Boston, domestic	7.75 8.00
Buffalo, No. 1	9.75-10.00
Buffalo, No. 2	11.00-11.50
Chicago, No. 1	13.25-13.75
Cleveland, No. 1	13.25
Cleveland, No. 2	12.25
Detroit, No. 1	10.00-10.50
Detroit, No. 2	8.75- 9.25
Eastern Pa., No. 1	12.50
Eastern Pa., No. 2	11.50
Federal, Ill.	10.25-10.75
Granite City, R. R.	11.25-11.75
Granite City, No. 2	9.25- 9.75
N. Y., deal. No. 2	7.50- 7.75
N. Y., deal. barge (No. 1 for export)	9.25
Pitts., No. 1 (R. R.)	14.50-15.00
Pitts., No. 1 (dlr.)	14.25-14.75
Pittsburgh, No. 2	13.00-13.50
St. Louis	9.25- 9.75
Toronto, dealers	8.00
Valleys, No. 1	13.75-14.00

COMPRESSED SHEETS

Buffalo, dealers	11.00-11.50
Chicago, factory	12.00-12.50
Chicago, dealer	11.50-12.00
Cleveland	12.50-13.00
Detroit	10.50-11.00
E. Pa., new mat.	11.50-12.00
Pittsburgh	14.25-14.75
St. Louis	7.00- 7.50
Valleys	13.25-13.75

BUNDLED SHEETS

Buffalo	9.00- 9.50
Cincinnati, del.	8.00- 8.50
Cleveland	9.75-10.25
Pittsburgh	13.00-13.50
St. Louis	5.50- 6.05
Toronto, dealers	5.00

SHEET CLIPPINGS, LOOSE

Chicago	7.50- 8.00
Cincinnati	7.50- 8.00
Detroit	7.50- 8.00
St. Louis	5.00- 5.50

STEEL RAILS, SHORT

Birmingham	12.50-13.00
Buffalo	15.00-15.50
Chicago (3 ft.)	14.50-15.00
Chicago (2 ft.)	15.50-16.00
Cincinnati, del.	14.00-14.50
Detroit	13.50-14.00
Pitts., open-hearth, 3 ft. and less	15.25-15.75
St. Louis, 2 ft. & less	14.00-14.50

STEEL RAILS, SCRAP

Boston	7.50- 7.75
Chicago	13.50-14.00
Pittsburgh	14.50-15.00
St. Louis	11.50-12.00
Buffalo	12.00-12.50
Toronto, dealers	9.00

STOVE PLATE

Birmingham	7.00- 7.50
Boston, dealers	4.75- 5.00
Buffalo	10.25-10.75
Chicago	7.50- 8.00
Cincinnati, dealers	7.50- 8.00
Detroit, net	7.00- 7.50
Eastern Pa.	10.00-10.50
N. Y., deal. fdry.	6.50- 7.00
St. Louis	7.00- 7.50
Toronto, dealers	7.50

COUPLERS, SPRINGS

Buffalo	14.50-15.00
Chicago, springs	14.50-15.00
Eastern Pa.	15.50-16.00
Pittsburgh	17.00-17.50
St. Louis	12.00-12.50

ANGLE BARS—STEEL

Chicago	14.50-15.00
St. Louis	12.25-12.75
Buffalo	14.50-15.00

RAILROAD SPECIALTIES

Chicago	14.50-15.00

LOW PHOSPHORUS

Buffalo, billet and bloom crops	14.50-15.00
Cleveland, billet, bloom crops	16.00-16.50
Eastern Pa., crops	16.00
Pittsburgh, billet, bloom crops	17.00-17.50
Pittsburgh, sheet bar crops	15.75-16.25

FROGS, SWITCHES

Chicago	13.50-14.00
St. Louis, cut	11.50-12.00

SHOVELING STEEL

Chicago	13.25-13.75
Federal, Ill.	10.25-10.75
Granite City, Ill.	9.25- 9.75
Toronto, dealers	5.00

RAILROAD WROUGHT

Birmingham	7.50- 8.00
Boston, dealers	6.00- 6.50
Buffalo, No. 1	11.00-11.50
Buffalo, No. 2	12.00- 12.50
Chicago, No. 1, net	12.00-12.50
Chicago, No. 2	13.25-13.75
Cincinnati, No. 2	11.00-11.50
Eastern Pa.	12.50
N. Y., No. 1 deal.	9.50-10.00
St. Louis, No. 1	9.25- 9.75
St. Louis, No. 2	10.50-11.00
Toronto, No. 1, dlr.	6.00

SPECIFICATION PIPE

Eastern Pa.	11.50
New York, dealers	6.75- 7.25

BUSHELING

Buffalo, No. 1	11.00-11.50
Chicago, No. 1	12.00-12.50
Cinci., No. 1, deal.	8.00- 8.50
Cincinnati, No. 2	5.00- 5.50
Cleveland, No. 2	8.25- 8.75
Detroit, No. 1, new	9.75-10.25
Valleys, new, No. 1	13.00-13.25
Toronto, dealers	5.00

MACHINE TURNINGS

Birmingham	6.00- 7.00
Boston, dealers	3.50- 3.75
Buffalo	5.75- 6.25
Chicago	6.50- 7.00
Cincinnati, dealers	6.00- 6.50
Cleveland	7.50- 8.00
Detroit	5.75- 6.25
Eastern Pa.	8.00
New York, dealers	4.00- 4.50
Pittsburgh	9.75-10.25
St. Louis	4.00- 4.50
Toronto, dealers	3.50
Valleys	9.00- 9.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	2.50- 2.75
Buffalo	7.75- 8.25
Cincinnati, dealers	5.50- 6.00
Cleveland	8.25- 8.75
Detroit	5.75- 6.25
Eastern Pa.	6.25- 6.50
New York, dealers	3.00- 3.50
Pittsburgh	8.75- 9.25
Toronto, dealers	4.00

CAST IRON BORINGS

Birmingham, plain	5.00- 6.00
Boston, chemical	5.50- 6.50
Boston, dealers	3.25- 3.50
Buffalo	7.75- 8.25
Chicago	6.00- 6.50
Cincinnati, dealers	5.50- 6.00
Cleveland	8.25- 8.75
Detroit	5.75- 6.25
E. Pa., chemical	10.00-12.00
New York, dealers	3.50- 4.00
St. Louis	3.75- 4.25
Toronto, dealers	4.50

PIPE AND FLUES

Cincinnati, dealers	7.50- 8.00

RAILROAD GRATE BARS

Buffalo	8.50- 9.00
Chicago, net	7.75- 8.25
Cincinnati	6.00- 6.50
Eastern Pa.	9.50-10.00
New York, dealers	5.50- 6.00
St. Louis	7.50- 8.00

FORGE FLASHINGS

Boston, dealers	6.75- 7.00
Buffalo	11.00-11.50
Cleveland	11.00-11.50
Detroit	9.00- 9.50
Pittsburgh	13.00-13.50

FORGE SCRAP

Boston, dealers	4.50- 5.00
Chicago, heavy	14.50-15.00
Eastern Pa.	11.50-12.00

ARCH BARS, TRANSOMS

St. Louis	12.25-12.75

AXLE TURNINGS

Boston, dealers	3.75- 4.25
Buffalo	10.50-11.00
Chicago, elec. fur.	13.00-13.50
Eastern Pa.	11.50
St. Louis	8.50- 9.00
Toronto	4.50

STEEL CAR AXLES

Birmingham	12.00-12.50
Boston, ship. point.	11.00-11.25
Buffalo	14.50-15.00
Chicago, net	14.50-15.00
Eastern Pa.	17.00
St. Louis	12.75-13.25
Toronto	8.00

SHAFTING

Boston, ship. point.	13.25-13.50
Eastern Pa.	18.50
New York, dealers	13.50-14.00
St. Louis	13.00-13.50

CAR WHEELS

Birmingham	10.00-11.00
Boston, iron deal.	7.75- 8.00
Buffalo, iron	11.00-11.50
Buffalo, steel	14.50-15.00
Chicago, iron	13.50-14.00
Chicago, rolled steel	14.50-15.00
Cincinnati, iron	11.00-11.50
Eastern Pa., iron	13.50-14.00
Eastern Pa., steel	16.00
Pittsburgh, iron	14.25-14.75
Pittsburgh, steel	16.25-16.75
St. Louis, iron	10.25-10.75
St. Louis, steel	12.00-12.50
Toronto, net	7.00

NO. 1 CAST SCRAP

Birmingham	11.00-12.00
Boston, No. 1 mach.	9.00- 9.25
Boston, No. 2	8.25- 8.50
Boston, tex. con.	8.50- 9.00
Buffalo, cupola	11.50-12.00
Buffalo, mach.	12.50-13.00
Chicago, agri. net	10.00-10.50
Chicago, auto	11.00-11.50
Chicago, mach. net	12.00-12.50
Chicago, railr'd net	10.50-11.00
Cinci., mach. cup	10.50-11.00
Cleveland, cupola	12.75-13.25
Detroit, net	11.50-12.00
Eastern Pa., cupola	12.50-13.00
E. Pa., mixed yard	10.50
Pittsburgh, cupola	13.75-14.25
San Francisco, del.	13.50-14.00
Seattle	7.50- 9.00
St. Louis, No. 1	11.00-11.50
St. L., No. 1 mach.	12.50-13.00
Toronto, No. 1, mach., net	8.50

HEAVY CAST

Boston, del.	6.75- 7.00
Buffalo, break.	10.25-10.75
Cleveland, break	10.50-11.00
Detroit, No. 1 mach. net	12.00-12.50
Detroit, break.	9.50-10.00
Detroit, auto net	11.50-12.00
Eastern Pa.	12.00-12.50
N. Y., break. deal.	8.00- 8.25
Pittsburgh	12.50-13.00

MALLEABLE

Birmingham, R. R.	11.50-12.50
Boston, consum.	13.50-14.50
Buffalo	15.00-15.50
Chicago, R. R.	16.00-16.50
Cincinnati, agri. del.	12.50-13.00
Cleveland, rail	16.00-16.50
Detroit, auto net	13.00-13.50
Eastern Pa., R. R.	15.50-16.00
Pittsburgh, rail	16.50-17.00
St. Louis, R. R.	13.75-14.25
Toronto, net	7.00

RAILS FOR ROLLING

5 feet and over

Birmingham	11.50-12.00
Boston, dealers	8.00- 8.50
Buffalo	12.00-12.50
Chicago	14.00-14.50
Eastern Pa.	13.00-14.00
New York, dealer	9.75-10.25
St. Louis	13.50-14.00

LOCOMOTIVE TIRES

Chicago (cut)	15.00-15.50
St. Louis, No. 1	11.75-12.25

LOW PHOS. PUNCHINGS

Buffalo	14.50-15.00
Chicago	15.00-15.50
Eastern Pa.	15.00-15.50
Pittsburgh (heavy)	16.25-16.75
Pittsburgh (light)	15.50-16.00

Iron Ore

Lake Superior Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

Foreign Ore

Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	10.50
No. Afr. low phos.	10.50
Swedish basic, 65%	9.50
Swedish low phos.	10.50
Spanish No. Africa basic, 50 to 60%	10.50
Tungsten, spot sh. ton unit, duty pd.	$15.85-16.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	19.25

Manganese Ore

(Nominal)

Prices not including duty, cents per unit cargo lots

Caucasian, 52-55%	26.00
So. African, 52%	26.00
So. Afr., 49-51%	24.00
Indian, 58-60%	nominal
Indian, 48-50%	nominal

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS

Baltimore*	3.00c
Boston††	3.10c
Buffalo	3.00c
Chattanooga	3.36c
Chicago (j)	3.00c
Cincinnati	3.22c
Cleveland	3.00c
Detroit	3.09c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.11c-3.26c
New Orleans	3.35c
New York‡ (d)	3.31c
Pitts. (h)	2.95c-3.10c
Philadelphia*	3.03c
Portland	3.70c
San Francisco	3.25c
Seattle	3.70c
St. Louis	3.25c
St. Paul	3.25c-3.40c
Tulsa	3.25c

IRON BARS

Portland	3.40c
Chattanooga	3.36c
Baltimore*	3.05c
Chicago	2.75c
Cincinnati	3.22c
New York‡(d)	3.36c
Philadelphia*	2.93c
St. Louis	3.25c
Tulsa	3.25c

REINFORCING BARS

Buffalo	2.60c
Chattanooga	3.36c
Chicago	2.10c-2.60c
Cleveland (c)	2.10c
Cincinnati	3.25c
Houston	3.25c
Los Ang., cl.	2.45c
New Orleans	3.50c
Pitts., plain (h)	3.05c
Pitts., twisted squares (h)	3.175c
San Francisco	2.45c
Seattle	2.45c
St. Louis	3.25c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES

Baltimore*	3.00c
Boston††	3.19c
Buffalo	3.25c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland	3.31c
Detroit	3.42c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York‡(d)	3.37c
Philadelphia*	2.98c
Pittsburgh (h)	3.15c
Portland (i)	3.70c
San Francisco	3.25c
Seattle (i)	3.70c
St. Louis	3.45c
St. Paul	3.45c
Tulsa	3.50c

PLATES

Baltimore*	3.00c
Boston††	3.21c
Buffalo	3.37c
Chattanooga	3.56c
Chicago	3.20c
Cincinnati	3.42c
Cleveland, ¼-in. and over	3.31c
Detroit	3.42c
Detroit, ⅜-in.	3.65c
Houston	3.00c
Los Angeles	3.60c
Milwaukee	3.31c
New Orleans	3.55c
New York‡(d)	3.40c
Philadelphia*	2.98c
Phila. floor	4.95c
Pittsburgh (h)	3.15c
Portland	3.55c
San Francisco	3.25c
Seattle	3.55c
St. Louis	3.45c
St. Paul	3.45c
Tulsa	3.50c

NO. 10 BLUE

Baltimore*	3.10c
Boston††	3.30c
Buffalo	3.62c
Chattanooga	3.36c
Chicago	3.05c
Cincinnati	3.22c
Cleveland	3.11c
Det., 8-10 ga.	3.14c
Houston	3.35c
Los Angeles	3.75c
Milwaukee	3.16c
New Orleans	3.55c
New York‡(d)	3.31c
Portland	3.75c
Philadelphia*	3.08c
Pittsburgh (h)	2.95c
San Fracisco	3.35c
Seattle	3.70c
St. Louis	3.45c
St. Paul	3.30c
Tulsa	3.70c

NO. 24 BLACK

Baltimore*†	3.60c
Boston (g)	3.95c
Buffalo	3.25c
Chattanooga	4.16c
Chicago	3.85c
Cincinnati	4.02c
Cleveland	3.91c
Detroit	3.94c
Los Angeles	4.35c
Milwaukee	3.96c
New Orleans	4.50c
New York‡(d)	3.89c
Philadelphia*†	3.60c
Pitts.** (h)	3.55c
Portland	4.40c
San Francisco	4.00c
Seattle	4.40c
St. Louis	4.10c
St. Paul	3.90c
Tulsa	4.75c

NO. 24 GALV. SHEETS

Baltimore*†	4.30c
Buffalo	4.00c
Boston (g)	4.65c
Chattanooga	4.86c
Chicago (h)	4.55c
Cincinnati	4.72c
Cleveland	4.61c
Detroit	4.72c
Houston	4.40c
Los Angeles	4.95c
Milwaukee	4.66c
New Orleans	4.95c
New York‡(d)	4.30c
Philadelphia*†	4.40c
Pitts.**(h)	4.15-4.45c
Portland	5.00c
San Francisco	4.50c
Seattle	5.00c
St. Louis	4.65c
St. Paul	4.50c
Tulsa	5.10c

BANDS

Baltimore*	3.20c
Boston††	3.30c
Buffalo	3.42c
Chattanooga	3.61c
Chicago	3.30c
Cincinnati	3.47c
Cleveland	3.36c
Detroit, ⅜-in. and lighter	3.39c
Houston	3.25c
Los Angeles	4.10c
Milwaukee	3.41c
New Orleans	3.95c
New York‡(d)	3.56c
Philadelphia	3.18c
Pittsburgh (h)	3.20c
Portland	4.25c
San Francisco	4.10c
Seattle	4.25c
St. Louis	3.55c
St. Paul	3.55c
Tulsa	3.45c

HOOPS

Baltimore	2.30c
Boston††	4.30c
Buffalo	3.42c
Chicago	3.30c
Cincinnati	3.47c
Det., No. 14 and lighter	3.39c
Los Angeles	5.85c
Milwaukee	3.41c
New York‡(d)	3.56c
Philadelphia	3.43c
Pittsburgh (h)	3.70c
Portland	5.60c
San Francisco	6.15c
Seattle	5.60c
St. Louis	3.55c
St. Paul	3.55c

COLD FIN. STEEL

Baltimore (c)	3.73c
Boston	3.90c
Buffalo (h)	3.55c
Chattanooga*	4.13c
Chicago (h)	3.50c
Cincinnati	3.72c
Cleveland (h)	3.50c
Detroit	3.79c
Los Ang. (f) (d)	5.85c
Milwaukee	3.61c
New Orleans	4.30c
New York‡(d)	3.81c
Philadelphia	3.76c
Pittsburgh	3.50c
Portland (f) (d)	6.15c
San Fran.(f) (d)	5.95c
Seattle (f) (d)	6.15c
St. Louis	3.75c
St. Paul	4.02c
Tulsa	4.65c

COLD ROLLED STRIP

Boston, 0.100-in., 500 lb. lots	3.245c
Buffalo	3.39c
Chicago	3.27c
Cincinnati (b)	3.22c
Cleveland (b)	3.20c
Detroit	3.33c
New York‡(d)	3.36c
St. Louis	3.45c

TOOL STEELS

(Applying on or east of Mississippi river; west of Mississippi 1c up)

	Base
High speed	57c
High carbon, high chrome	37c
Oil hardening	22c
Special tool	20c
Extra tool	17c
Regular tool	14c

Uniform extras apply.

BOLTS AND NUTS

(100 pounds or over)

	Discount
Chicago (a)	70
Cleveland	70
Detroit	70-10
Milwaukee	70
Pittsburgh	70

(a) Under 100 pounds, 65 off.

(b) Plus straightening, cutting and quantity differentials; (c) Plus mill, size and quantity extras; (d) Base prices; (e) New mill classif. (f) Rounds only; (g) 50 bundles or over; (h) Outside delivery, 10c less; (i) Under 3 in.; (j) shapes other than rounds, flats, fillet angles, 3.15c.

‡Domestic steel; *Plus quan. extras; **Under 25 bundles; *†50 or more bundles; † New extras apply; ††Base 40,000 lbs., extras on less.

Prices on heavier lines are subject to new quantity differentials; 399 lbs. and less, up 50 cts.; 400 to 9999 lbs., base; 10,000 to 19,999 lbs., 15 cts. under; 20,000 to 39,999 lbs., 25 cts. under; 40,000 lbs. and over, 35 cts. under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, Jan. 23

Export Prices f. o. b. Ship at Port of Dispatch—(By Cable or Radio)

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, metric tons Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
PIG IRON			
Foundry, 2.50-3.00 Silicon	$15 44 3 2 6	$13 38	1 13 0
Basic bessemer	15 44 3 2 6*	12 32	1 10 0
Hematite, Phos. .03-.05	16 09 3 5 0	.....	.....
SEMIFINISHED STEEL			
Billets	$27 22 5 10 0	$19 02	2 7 0
Wire rods, No. 5 gage	42 08 8 10 0	36 44	4 10 0
FINISHED STEEL			
Standard rails	$40 84 8 5 0	$44 53	5 10 0
Merchant bars	1.65c 7 10 0	1.15c to 1.20c	3 2 6 to 3 5 0
Structural shapes	1.65c 7 10 0	1.14c	3 1 6
Plates, ¼ in. or 5 mm.	1.76c 8 1 3	1.56c	4 5 0
Sheets, black, 24 gage or 0.5 mm.	2.15c 9 15 0	2.13c	5 16 0††
Sheets, gal., 24 gage, corr.	2.59c 11 15 0	2.28c	6 5 0
Bands and strips	1.87c 8 10 0	1.46c	4 0 0
Plain wire, base	2.04c 9 5 0	1.76c	5 5 0
Galvanized wire, base	2.37c 10 15 0	2.15c	5 17 6
Wire nails, base	2.65c 12 0 0	1.75c	4 15 0
Tin plate, box 108 lbs.	$4.65 0 18 9	.....	.....

British ferromanganese $75 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d $(43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5	$17.32	3 10 0(a)	$17.13	260	$12.87	385	$25.48	63
Basic bessemer pig iron	17.32	3 10 0(a)	12.52	190	11.88	350	28.11 (b)	69.50
Furnace coke	4.85	0 19 6	6.26	95	4.14	122	7.68	19
Billets	27.22	5 10 0	28.34	430	18.33	540	39.02	96.50
Standard rails	2.21c	8 5 0	2.00c	671	1.69c	1,100	2.63c	132
Merchant bars	2.31c	8 12 0	1.68c	560	.92c	600	2.19c	110
Structural shapes	2.34c	8 15 0	1.65c	550	.92c	600	1.97c	107
Plates, ¼-in. or 5 mm.	2.43c	9 1 3	2.10c	700	1.07c	700	2.32c	127
Sheets, black	3.09c	11 10 0§	1.80c	600‡	1.26c	825‡	2.67c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.62c	13 10 0	2.85c	950	2.30c	1,500	6.78c	370
Plain wire	2.49c	9 5 0	2.64c	900	1.77c	1,150	3.17c	173
Bands and strips	2.52c	9 7 0	1.95c	650	2.71c	800	2.32c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel, a del. Middlesbrough. b hematite. ††Close annealed.

**Gold pound sterling carries a premium of 66.25 per cent over paper sterling.

Bars

Bar Prices, Page 64

Pittsburgh—Somewhat more improvement in the steel bar market is appearing this week. While there still is a lull in automotive parts demand, this is believed only temporary and meanwhile, somewhat larger tonnages are moving into other lines of manufacture. Implement makers, mechanical refrigerator builders, railroads for car repairs and a somewhat wider line of miscellaneous consumers are more actively buying. Shipments continue good and mill operations average about 55 per cent.

Cleveland—Specifications from automobile manufacturers are lighter, reflecting the trend in car production. Many automobile forge shops are operating only three days a week. On the other hand, no decline is noted in releases from agricultural implement manufacturers, and some of them are advancing operating schedules. Demand from machine tool builders continues strong. At the exposition and convention of the American Road Builders association in Cleveland last week, predictions were made by leaders in the road equipment industry that their sales this year will set a new record.

Chicago—Steel bar demand is holding well in most directions, though reduced requirements of the automotive industry are curtailing total business. Operations of farm implement manufacturers have tended upward for several weeks, with dealers stocking more extensively than a year ago. Bar demand from miscellaneous consumers generally is steady. Prices are firm.

New York—Buying of steel bars is moderate with principal specifications coming from jobbers and bolt and nut manufacturers. Prices are steady.

Philadelphia—While not brisk, commercial steel bar specifications are nevertheless being fairly sustained in volume. Cold finishing operations in the district are good, with substantial releases still being made by machine tool builders. Railroad and ship tonnage also is better on an average than in considerable time. The market is 1.85c, Pittsburgh, or 2.16c, Philadelphia.

Semifinished

Semifinished Prices, Page 65

Routine shipments of billets, sheet bars and slabs continue to be made by producing mills. New business is slow and mainly for small lots since most consumers covered expected requirements late last month. Hot-rolled breakdowns are figuring more prominently in the semifinished market in the Pittsburgh district, to non-integrated mills. This feature seems to have more of permanence about it with each succeeding month and now is running into good tonnage figures.

Plates

Plate Prices, Page 64

Pittsburgh—The plate market continues quiet with most new business from river barge and dredge work. Railroad car and locomotive repairs continue to absorb small single tonnages of plates. Dravo Contracting Co. was low bidder at $582,614.14 for a self-propelled 20-inch pipe line dredge for which bids were opened Jan. 20 at Louisville, Ky., in the office of United States engineers. If wrought iron plates are demanded, $7500 is to be added to this figure. Bids also were opened by United States engineers at Huntington, W. Va., for four steel cargo boxes to be placed on existing federal open barges, on which Riverside Steel Co., Wheeling, submitted the lowest figure of $1602. High water is preventing contract work on several Ohio and Kanawha river dams.

Cleveland—Plate mills are expecting 6500 to 7000 tons of steel, largely plates, for repairs to 1700 Chesapeake & Ohio freight cars, which were awarded last week to private car shops. A substantial tonnage also is anticipated soon for new equipment to be purchased by the Erie railroad. Railroad demand promises to be the leading outlet for plates over the next few months, little tank work being in prospect.

Chicago—Plate demand from railroads is increasing slowly, but activity of freight car builders is restricted. The Burlington road is taking material for cars it is building in its own shops and several other roads are more active in repair work. An increase in plate requirements of structural fabricators is looked for within 30 days. Tank business still is spotty.

New York—Carbuilders here participating in distribution of steel for the Pennsylvania's car program have completed formal contracts for plain material. This leaves shipwork the most important feature of the market. In addition to the 15,000 tons of hull steel still pending for the liner to be built by Newport News Shipbuilding & Dry Dock Co., Newport News, Va., possibly 10,000 tons will be required for work for the American-South African Steamship lines and 500 tons for two barges placed by the Texas Co., with Todd Dry Dock Engineering & Repair Corp., New York. The additional tonnage for the South African line is predicated on the possibility of two ships being awarded instead of one. The award is expected early next month.

Philadelphia—Miscellaneous plate demand is light, although producers generally have received in the past week formal contracts covering most requirements of the Pennsylvania car program. Further, sellers figuring on bolt tonnage with the Sun Shipbuilding Co., Chester, Pa., now have, it is believed, a rather fair idea as to how they will participate in the 20,000 tons or more of steel on inquiry, although they have still received no definite assurances. It appears as if it will be possibly another two or three weeks before formal contracts will be let. The ship work for the American-South African Steamship Lines Inc., New York, originally scheduled to be placed in the week beginning Jan. 20, has been postponed until after Feb. 1, when, it is believed, two cargo-passenger boats, instead of one, will possibly be placed. Each of these boats, it is estimated, will require about 5000 tons of hull steel. Among the few tank jobs pending is one for the government barracks at Carlisle, Pa. Plates are being generally held at 1.90c, Bethlehem, Pa., or 1.99½c, Philadelphia.

San Francisco—The outlook in the plate market is encouraging. So far this year 34,561 tons have been placed and pending business calls for more than 15,000 tons. This almost equals the total tonnage placed last year. Western Pipe & Steel Co. is low on 500 tons of 20 and 24-inch welded steel pipe for San Francisco. The El Capitan and La Mesa pipe line, up for figures Jan. 28, will require 3000 tons for a 36-inch to 46-inch line.

Seattle—While inquiry is not active and no tonnages of importance are pending, projects involving plates are under consideration and may be out for figures soon. Pittsburgh-Des Moines Steel Co. has been awarded a steel tank and 100-foot water tower, involving about 50 tons, by Kimberly, Idaho.

Contracts Placed

550 tons, for elevated tank for Rockville Center, New York to Pittsburgh-Des Moines Steel Co., Pittsburgh.

Contracts Pending

9500 tons, 60-inch welded steep pipe, Crystal Springs to Lagunda Honda, for San Francisco; bids Feb. 5.

3000 tons, El Capitan pipe line for San Diego, Calif., and for La Mesa, Lemon Grove and Spring Valley irrigation district, La Mesa, Calif; bids Jan. 28.

500 tons, 20 and 24-inch welded steel pipe, San Francisco; Western Pipe & Steel Co., San Francisco, low.

Transportation

Track Material Prices, Page 65

Rail buying continues the principal activity of railroads, with some tonnages being placed and 1936 requirements being formulated by various roads. Chicago & North Western has placed 16,000 tons with Inland Steel Co., Chicago. New York Central will open bids Jan. 29 for 35,000 tons of rails and 3500 tons of accessories. The Virginian has opened bids on 4100 tons of rails and some accessories. The Erie includes about 18,000 tons of rails in its 1936 requirements, which will be out for bids in a short time.

The Kansas, Oklahoma & Gulf is seeking a PWA loan of $285,000 for purchase of 5000 tons of 110-pound rails and 500 tons of 90-pound rails, as well as sufficient accessories. Missouri Pacific has been authorized by the federal court to expend $6,422,896 for betterments, and this will include a tonnage of rails, as well as shop equipment, locomotives and freight and passenger cars. Seattle has awarded 500 tons of 82-pound rail to Pacific Coast Steel Corp., Seattle. St. Louis Southwestern is inquiring for 500 to 1500 tons of rails.

Chicago, Burlington & Quincy has placed an order with Edward G. Budd Mfg. Co., Philadelphia, for two ten-car light weight stainless steel trains for overnight service between Chicago and Denver. Chesapeake & Ohio has awarded to several private car shops repairs to 1700 hopper cars. The Erie is including in its program for 1936 500 to 1000 freight cars. New York, New Haven & Hartford requirements for new freight cars will call for about 1500 open-top cars and 500 box cars.

Lehigh Valley will build 1000 50-ton coal cars in its own shops, 500 to be all steel, 500 composite. Interstate commerce commission's approval is expected momentarily, work to begin immediately.

Pacific Fruit Express is in the market for 3000 refrigerator cars.

Whitcomb Locomotive Co., an affiliate of Baldwin Locomotive Works, Eddystone, Pa., is low on one five to 18-ton gasoline-mechanical industrial locomotive for the Municipal airport at Philadelphia. Chicago & North Western has ordered 28 air conditioning units from the Waukesha Motor Co., Waukesha, Wis.

Buses Booked

American Car & Foundry Motors Co., New York: Two 29-passenger for Queens Nassau Transit Corp., New York; two 35-passenger for Triple Cities Traction Corp., Binghamton, N. Y.

Twin Coach Corp., Kent, O.: Fifteen 22-passenger for Eastern Massachusetts Street Railway Co., Boston; five 30-passenger for Baltimore Transit Co., Baltimore.

White Motor Co., Cleveland: Ten 36-passenger city coaches for St. Louis Public Service, St. Louis, Mo.; seven 23-passenger for Illinois Light & Power Co., Champaign, Ill.; six 35-passenger city coaches for Triboro Coach Service, Long Island City, L. I., N. Y.; five 20-passenger for Albuquerque Bus Co., Albuquerque, N. M.; four 21-passenger for DeLuxe Coach Service, Lodi, N. J.

Car Orders Placed

Baltimore Transit Co., Baltimore, 25 trolley car bodies, to St. Louis Car Co., St. Louis.

Chicago, Burlington & Quincy, two 10-car Zephyr trains, to Edward G. Budd Mfg. Co., Philadelphia.

Lehigh Valley, 1000 50-ton coal cars to own shops, 500 all steel, 500 composite.

Rail Orders Placed

500 tons, 82-pound rails, for Seattle municipal system, to Pacific Coast Steel Corp., Seattle.

Chicago & North Western, 16,000 tons, to Inland Steel Co., Chicago.

Car Orders Pending

Pacific Fruit Express, 3000 refrigerator cars; bids asked.

Rail Orders Pending

St. Louis Southwestern, 500 to 1500 tons rails; bids asked.

Virginian Railway, 4100 tons of rails, with an additional tonnage of accessories, not including spikes, pending.

Sheets

Sheet Prices, Page 64

Pittsburgh—Mill operations here have dropped off somewhat from the preceding week to an average of about 65 per cent. A larger producer is operating at about 70 per cent, and the independents, 55 to 60 per cent. New business is about level in volume with the preceding week, miscellaneous consumers partly making up for the loss by the automobile partsmakers. The volume of specifications on contracts also is fair.

Cleveland—Further curtailment is noted in specifications from automobile manufacturers, and little improvement is expected from this source until the middle of February when additional buying will be done for the increased production anticipated in March. Orders from other large consumers are fairly steady. The concession of $3 a ton on hot and cold rolled annealed sheets so far has been restricted to automobile manufacturers, and partsmakers in the Michigan and northern Ohio territory, on an f.o.b. Detroit basis.

New York—The sheet situation is spotty, with volume at least holding its own, as compared with a week ago. Some important sellers have seen little change so far this month, while others report some gains. Deliveries and prices are unchanged.

Chicago—Sheet demand is quieted by the curtailment in automotive releases. While business elsewhere is fairly steady, the importance of automotive tonnage dominates.

Philadelphia—While some sellers report improvement in miscellaneous sheet specifications, it now appears plain that the pickup since inventory season has not been on the scale anticipated early in the month. Mill shipments are about the same, except for slightly easier deliveries on hot rolled sheets, ranging two to three weeks. Most sellers have now received their formal contracts for steel for the Pennsylvania car program. Steel for the two 10-car streamlined trains recently booked by the Edward G. Budd Mfg. Co. for the Chicago, Burlington & Quincy, has been placed, it is said, although full details have not been divulged.

The order from the Chicago, Burlington & Quincy for two 10-car Zephyr trains placed with the E. G. Budd Mfg. Co., Philadelphia, calls for 300 tons of stainless steel sheets, possibly the largest single purchase of this material ever made here.

Buffalo — Buffalo district hand sheet mills continue to operate at 90 per cent but unfilled orders are not as large as they were in the fourth quarter. Their future output will be regulated largely by the speed with which Bethlehem Steel Co.'s new strip mill here is able to reach commercial production.

Cincinnati—Demand for sheets is in good volume, sustaining operations close to 75 per cent, but nevertheless showing a decline from fourth quarter levels. Shrinkage in automotive needs has not been abrupt, and miscellaneous specifications are holding steady. Extreme cold weather has hampered installation of a new mill by the leading interest and date for start in operations is indefinite. Price concessions in the Detroit district have not been extended here.

St. Louis—There is a moderate recession in both new orders and specifications. More hesitation is noted in farm buying. Outlet through the stove industry has been temporarily narrowed by labor troubles and the inventory and repair period.

Birmingham, Ala.—Sheet mills are operating actively and demand for the product is strong with prospects promising. In addition to rotary shears the Tennessee Coal, Iron & Railroad Co. is adding a small annealing furnace at its sheet mills at Fairfield, the two improvements to cost more than $250,000.

Pipe

Pipe Prices, Page 65

Pittsburgh—Contract for 115 miles of 8-inch line pipe from Rusk to Conroe, Tex., for the American Liberty Pipe Line Co., is understood to have been placed with the National Supply Co., Pittsburgh.

Chicago—Cast pipe orders are confined to small lots, though producers report a fair volume of business resulting from the aggregate of such tonnages. Northern cities are in no hurry to take delivery, because of weather conditions, but a large volume of tonnage pending points to fair activity in construction of water and sewage systems within the next few months. Bids still are to be taken on a number of PWA projects.

New York—About 1000 tons of cast pipe was placed last week by the procurement division, treasury department, New York, for PWA work in New York state. Additional tonnages are pending. The Public Service Corp. of New Jersey is expected to take bids soon on about 800 tons. A project located close to New York city may require some 10,000 tons. Cast pipe interests are expecting to book an unusually large tonnage in 1936. Prices are fairly firm.

Birmingham, Ala.—Additional awards for cast pipe and fittings will add materially to backlogs during the last week of this month and the first half of next month. The far West is receiving considerable pipe from this district.

San Francisco—Momement of cast pipe continues unchecked and awards so far this year, are in excess of those placed for the corresponding period last year. Larger bookings included 550 tons for Watsonville, Calif., and 273 tons for Fresno, Calif., secured by United States Pipe & Foundry Co.

Seattle—Awards are slow in being released, and considerable tonnage is pending. H. G. Purcell, Seattle, for United States Pipe & Foundry Co., Burlington, N. J., has booked approximately 900 tons of 4 to 12-inch cast pipe. Port Orford, Oreg., will open bids Feb. 1 for 6900 feet of 6 and 8-inch cast pipe and 8500 feet of galvanized pipe and accessories. Canyon, Oreg., will open bids Feb. 6 for 18,500 feet of 4-inch steel pipe.

Cast Pipe Placed

550 tons, 4 to 14-inch, Watsonville, Calif., to United States Pipe & Foundry Co., Burlington, N. J.
500 tons 48-inch, Buffalo, to United States Pipe & Foundry Co., Burlington, N. J., through procurement division, treasury department, New York.
349 tons, 6-inch, McCammon, Idaho, to Pacific States Cast Iron Pipe Co., Provo, Utah.
316 tons, 8 and 12-inch, Enumclaw, Wash., to United States Pipe & Foundry Co., Burlington, N. J.
300 tons, 36, 42 and 48-inch, Buffalo, to United States Pipe & Foundry Co., Burlington, N. J., and Warren Foundry & Pipe Corp., Phillipsburg, N. J., through procurment division, treasury department, New York.
273 tons, 6 to 12-inch, Fresno, Calif., to United States Cast Iron Pipe Co., Burlington, N. J.
255 tons, 4 and 8-inch, Snohomish, Wash., to United States Pipe & Foundry Co., Burlington, N. J.
190 tons, 4 and 8-inch, Ridgefield, Wash., to United States Pipe & Foundry Co., Burlington, N. J.
150 tons, 6, 8 and 12-inch, sewage project, Rahway, N. J., to Donaldson Iron Works, Emaus, Pa.
122 tons, 6-inch, Eatonville, Wash., to United States Pipe & Foundry Co., Burlington, N. J.

Cast Pipe Pending

749 tons, 18-inch, Antioch, Calif.; bids Jan. 27.
670 tons, 4 and 6-inch, Oakland, Calif.; bids opened.
245 tons, Nephi, Utah; bids opened.
215 tons, 6 and 12-inch, Pearl Harbor, T. H., schedule 8128; bids Jan. 29.
183 tons, 4 to 12-inch, Suisun, Calif.; bids Jan. 31.
178 tons, 6 to 12-inch, treasury department, San Francisco; bids opened.
110 tons, 4 and 6-inch, Sunset, Utah; bids opened.
Unstated, 6 and 8-inch, Port Orford, Oreg.; bids Feb. 1.

Steel Pipe Placed

6000 tons, 8-inch, pipe line from Rusk to Conroe, Tex., to National Supply Co., Pittsburgh.

Steel Pipe Pending

Unstated tonnage, 35,000 feet of 6-inch welded, for crude oil transmission line, Phillips Petroleum Co., Bartlesville, Okla.
Unstated, 18,500 feet 4-inch, Canyon, Oreg., water system; bids Feb. 7.

Strip Steel

Strip Prices, Page 65

Pittsburgh—Strip mills are operating at an unchanged rate of 50 per cent and some are accumulating several weeks' backlog. Hot-rolled strip is in most demand but outlets for cold-rolled are gaining as radio, refrigerator and other consumers expand operations.

Cleveland—Strip steel demand from automobile manufacturers has declined sharply, but orders from miscellaneous sources are fairly plentiful. Advices to steel producers here are that automobile production this month will be about 15 per cent less than in December, and a further reduction of 10 to 15 per cent will be made in February.

Chicago—Mills feel the effect of curtailed automotive schedules and total shipments are lighter despite fairly steady demand from other consumers. A quiet situation in automotive buying is anticipated for the next four to six weeks. Some pressure on prices has developed from recent weakness in other centers, though the market here remains reasonably steady.

New York—Tonnage of cold-rolled strip is moderately well sustained this month in spite of fewer automobile accessory manufacturers. Cold finishers describe business as largely miscellaneous. Prices are steady.

Philadelphia—Slightly better strip specifications are coming out from radio manufacturers in this district. Otherwise, demand appears little changed. Hot strip is unchanged at 1.85c, Pittsburgh, or 2.16c, Philadelphia; and cold strip at 2.60c, or 2.91c.

Wire

Wire Prices, Page 65

Cleveland—Demand for manufacturers' wire is well sustained, little change being noted here from the tonnages in December. Farm material is moving slowly, as usual at this time of the year. Prices are steady.

Chicago—Wire demand has moderated from its early January pace, but the month as a whole still is expected to better sales of a year ago. The decline in automotive needs is chiefly responsible for the lessened activity lately since business elsewhere is well maintained. The automotive lull, however, is expected to be only temporary, with an increase seen for late February. Jobbers' stocks of merchant wire products in many instances are light and this situation shortly will be corrected in view of the favorable outlook for distributors in most districts. Prices of wire and wire products are steady.

Philadelphia—While nail prices here appear fairly steady at the official price of 2.40c, Pittsburgh, weakness continues to be noted along the southeastern seaboard. On a carload of nails for the commonwealth of Virginia recently, the Nelson Hardware Co., Roanoke, Va., bid the equivalent of 2.15c, Pittsburgh, and other bids were close to this figure.

Miscellaneous buying of wire products here is still spotty, with most buyers fairly well covered for present, after having bought rather substantially over the closing weeks of last year.

Carroll-McCreary Co. Inc., steel jobber, has moved from 21-51 Borden avenue, Long Island City, to 46-81 Metropolitan avenue (Bohack terminal), Brooklyn, N. Y.

Shapes

Structural Shape Prices, Page 64

Cleveland — Industrial work is more active. For a group of buildings for Fisher Body Corp., Grand Rapids, Mich., 4250 tons have been awarded Jones & Laughlin Steel Corp. Electro Metallurgical Sales Corp., New York, has taken bids on 1700 tons for a building at Alloy, W. Va. The state of Ohio is taking bids on a number of public works projects Feb. 4, the largest, 1200 tons for a bridge over Black river, near Elyria,Lorain county.

Chicago—Awards of fabricated shapes involving large lots are few, the leading item being 1100 tons for a new mill building for Inland Steel Co. Plant construction for other steel companies in this district involves 1050 tons. Inquiries are heavier, headed by 5000 tons for a city hall in Kansas City, Mo. New bids will be taken on 1580 tons for two subways here, previous bids having been rejected because of high prices. Specifications for plain material continue to improve.

Philadelphia—Public work is becoming more active with the likely announcement soon of the placing of shapes for some local school work and with bids recently opened on a 500-ton hangar at the Philadelphia navy yard, on which the Belmont Iron Works, Eddystone, Pa., is low. The situation, however, is still disappointing to most fabricators.

Cincinnati—The flurry of last quarter has temporarily subsided. Suppliers customarily bidding on Kentucky state proposals encounter delays in lettings, due largely to change in administration, and some governmental financing problems, one of which was the sequel to elimination of the retail sales tax.

Birmingham, Ala. — Fabricating shops are busy and report new business every week. Ingalls Iron Works Co. will start work on the four scows placed by the war department involving 800 tons for use in the Pittsburgh territory at its new Decatur boat works on the Tennessee river.

Seattle — Fabricating plants have more work in hand than for some time and other important jobs are pending. Steel Fabricators Inc., here, booked 250 tons for miscellaneous school structures and 175 tons in bridge and other Washington state jobs. Bids for the Swinomish Slough bridge, involving 250 tons, were opened Jan. 18 at Mount Vernon, Wash.

San Francisco—Awards so far this year are nearly four times as large as they were a year ago for the same period. To date 8827 tons have been placed while last year only 2425 tons were booked. Important lettings included 500 tons for a bridge for the metropolitan water district, Los Angeles, by Western Pipe & Steel Co., and 400 tons for a crossing at Salinas, Calif., taken by Ingalls Iron Works Co., Birmingham, Ala.

Shape Contracts Placed

4250 tons, press and die shop, metal storage office, cafeteria, and power house for Fisher Body Corp., Grand Rapids, Mich., to J. A. Utley Co., Detroit, general contractor, and Jones & Laughlin Steel Corp., Pittsburgh.

2800 tons, office building for E. I. duPont de Nemours & Co. Inc., Wilmington, Del., to American Bridge Co., Pittsburgh.

1350 tons, ward buildings, Manteno, Ill., to Duffin Iron Co., Chicago.

1130 tons, rayon plant for E. I. duPont de Nemours & Co. Inc., Amphill, Va., to Bethlehem Steel Co., Bethlehem Pa.

1100 tons, mill building, Inland Steel Co., Indiana Harbor, Ind., to Joseph T. Ryerson & Son Inc., Chicago.

1025 tons, Inland Steel Co. scrap yard runway, Indiana Harbor, Ind., to Mississippi Valley Steel Co., Chicago.

1000 tons, bridge, Frankfort, Ky., to Wisconsin Bridge & Iron Co., Milwaukee.

825 tons, store building for S. H. Kress & Co., Atlanta, Ga., to Bethlehem Steel Corp., Bethlehem, Pa.

800 tons, Madison Square postoffice, New York, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

650 tons, including 150 tons of piling, Oldmen's creek state bridge, New Jersey, through the Vare Construction Co., Philadelphia, general contractor, to the Bethlehem Steel Co., which was also awarded 100 tons of reinforcing bars.

610 tons, Virginia Electric & Power Co. extension, Richmond, Va., to Virginia Bridge & Iron Co., Roanoke, Va.

550 tons, Racine street bridge, Jefferson, Wis., to Milwaukee Bridge Co., Milwaukee.

550 tons, normalizing plant, Carnegie-Illinois Steel Co., Gary, Ind., to American Bridge Co., Pittsburgh.

500 tons, building, Northwestern Barb Wire Co., Sterling, Ill., to Joseph T. Ryerson & Son Inc., Chicago.

500 tons, bridge for metropolitan water district, Los Angeles, specification 137, to Western Pipe & Steel Co., San Francisco.

500 tons, Brooklyn college library, Brooklyn, N. Y., to Weatherly Steel Co., Weatherly, Pa., through William Kennedy Co., Brooklyn.

479 tons, bridges in Quay, Otero, Hidalgo, Guadalupe and Torrance counties, New Mexico, to unnamed interests.

460 tons, bridge in Cheyenne county, Kansas, to Omaha Steel Co., Omaha, Nebr.

460 tons, state sanitarium at Wallum Lake, R. I., to Bethlehem Steel Co., Bethlehem, Pa.

430 tons, high school building, Paterson, N. J., to Lehigh Structural Steel Co., Allentown, Pa.

425 tons, miscellaneous bridge and school projects in Washington, to Steel Fabricators, Inc., Seattle.

400 tons, crossing, Salinas, Calif., to Ingalls Iron Works Co., Birmingham, Ala.

400 tons, pumping units, metropolitan water district, Los Angeles, specification 133, to unnamed interest.

365 tons, Illinois river lock, Peoria, Ill., to Lakeside Bridge & Steel Co., Milwaukee.

320 tons, West high school, Cleveland, to Bethlehem Steel Co., Bethlehem, Pa.

300 tons, state bridge work on Ridge Pike, Montgomery county, Pennsylvania, awarded through the Yeo Construction Co., Philadelphia, to the Bethlehem Steel Co., Bethlehem, Pa.

296 tons, gates for Bull Lake dam, Riverton, Wyo., to unnamed interest.

275 tons, highway bridge, Rochester, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

270 tons, storage seller, Falls City Ice Co., Louisville, Ky., to Bedford Foundry & Machine Co., Bedford, Ind.

210 tons, highway bridge, Burlington, N. C., to Virginia Bridge & Iron Co., Roanoke, Va.

200 tons, Gordon Bakery shipping room, Long Island City, N. Y., to Ingalls Iron Works Co., Birmingham, Ala.

200 tons, public school No. 127, New York, to Weatherly Steel Co., Weatherly, Pa., through Dover Construction Co., New York.

200 tons, lower west side health center, New York, to Harris Structural Steel Co., New York; through Stock Construction Co., New York.

200 tons, highway bridge, Paterson, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

177 tons, state bridge, Borset, Vt., to Boston Bridge Works; through A. L. Phelps, Boston.

175 tons, high school, Reedsburg, Wis., to Wausau Iron Works Co., Wausau, Wis.

170 tons, two state bridges, Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa.; one bridge involves 112 tons and will be erected in Tioga county, route 22, section 2, and the other will be built in Northumberland county, involving 58 tons.

155 tons, underpass, Johnson county, Kansas, to Kansas City Structural Steel Co., Kansas City, Mo.

148 tons, James Ford Rhoades high school, Cleveland, to Bethlehem Steel Co., Bethlehem, Pa.

140 tons, state bridge, Hampton Village, N. H., to Boston Bridge Works, through Engineering Service & Construction Co., Boston.

135 tons, state highway bridge, Erie county, New York, to Lackawanna Steel Construction Co., Buffalo.

130 tons, state highway bridge, Greene county, New York, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

125 tons, steel viaducts, Burt county, Nebraska, to Omaha Steel Co., Omaha, Nebr.

120 tons, medical-dental college, Chicago, to New City Iron Works, Chicago.

120 tons, bridge, Caddo county, Oklahoma, to J. B. Klein Iron & Foundry Co., Oklahoma City, Okla.

120 tons, bridge, Custer county, Oklahoma, to J. B. Klein Iron & Foundry Co., Oklahoma City, Okla.

Shape Awards Compared

	Tons
Week ended Jan. 27	**26,155**
Week ended Jan. 20	**26,841**
Week ended Jan. 13	**24,216**
This week, 1935	**7,746**
Weekly average, 1935	**17,081**
Weekly average, 1936	**23,465**
Weekly average, December	**23,300**
Total to date, 1935	**55,237**
Total to date, 1936	**93,862**

110 tons, tunnel ribs, metropolitan water district, Los Angeles, bid 51115, to Consolidated Steel Corp., Los Angeles.

100 tons for Hanna garage, Cleveland, and factory building in northern part of Ohio, to Republic Structural Iron Works, Cleveland.

100 tons, tunnel ribs, metropolitan water district, Los Angeles, bid 51107, to Consolidated Steel Corp., Los Angeles.

100 tons, plant for Standard Oil Co., San Francisco, to Milwaukee Bridge Co., Milwaukee.

Shape Contracts Pending

10,000 tons, bridge over Neches river, Port Arthur, Tex.

5000 tons, city hall, Kansas City, Mo.

2000 tons, postoffice, Indianapolis.

1750 tons, bridge, Havana, Ill.; Duffin Iron Co., Chicago, low.

1700 tons, building at Alloy, W. Va., for Electro Metallurgical Sales Corp., New York; bids in.

1450 tons, four highway bridges, scattered locations, state of Wisconsin; bids close Feb. 4.

1300 tons, sheet piling, foundations for civic center, San Diego, Calif.; bids soon.

1200 tons, Black river bridge, Lorain county, near Elyria, O., for state; bids Feb. 4.

1000 tons, Curtis high school addition, Staten Island, N. Y., bids to be opened Jan. 25.

550 tons, highway bridge, Jefferson, Wis.

500 tons, ventilating building, midtown tunnel, New York, bids to be opened Jan. 29.

500 tons, dredge for Yuba Mfg. Co., Yuba, Calif.; bids opened.

500 tons, paper mill for Smith Paper Co., Lee, Mass.

492 tons, crossing at Grand Junction, Mesa county, Colorado; bids opened.

380 tons, subway, Railroad avenue, Evanston, Ill.; bids rejected. New bids Jan. 31.

300 tons, bridge for New York state transit commission, Glendale, L. I.

300 tons, Cedar exchange, Ohio Bell Telephone Co., Cleveland; bids Feb. 10.

300 tons, New York Central railroad crossing, Newark, N. Y.; bids in.

250 tons, county bridge, Swinomish Slough, Wash.; bids in.

194 tons, over-crossing, Parkwater, Spokane county, Washington; bids opened.

160 tons, Iron Mountain pumping plant, metropolitan water district, Los Angeles; Clyde W. Wood and M. J. Bevanda, Stockton, Calif., low on general contract.

150 tons, tunnel ribs, bid 51635, metropolitan water district, Los Angeles; bids opened.

135 tons, tunnel ribs, bid 51620, metropolitan water district, Los Angeles; bids opened.

125 tons, postoffice, Galesburg, Ill.

100 tons or more, state bridge, Laurel, Mont.; bids in.

100 tons or more, state bridge, Walla Walla county, Washington; James Coyle, Seattle, general contractor.

100 tons, under-crossing near Phoenix, Maricopa county, Arizona; bids opened.

Unstated, state bridge, Snake river, Idaho; Warren Northwestern Construction Co., Portland, Oreg., low.

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Reinforcing

Reinforcing Bar Prices, Page 65

Philadelphia—Business has taken a spurt, with more than 2500 tons awarded in the past few days for school work. The Sweet Steel Co., Williamsport, Pa., figuring on re-rolled bars, received the largest tonnage in the aggregate, approximately 1100 tons, covering work for four schools. The American Steel Engineering Co., Philadelphia, supplying billet steel bars, was second with 825 tons for two schools. In addition a few state projects, in Pennsylvania and New Jersey, have been let. The largest pending job is a federal housing project at Branchville, Md., involving 2500 tons and on which bids were opened last week.

New York—Awards aggregated slightly over 1000 tons, with large tonnages involved in pending work, most of which is expected to be placed in the near future. Prospects for new work are good. The New Jersey highway department in the near future is expected to begin advertising for bids on some 20 to 25 grade crossing projects throughout the state.

Pittsburgh—Highway and general business throughout this district and state is held up by severe cold and heavy storms.

Cleveland—Awards are light, and chiefly for public works projects. The state of Ohio takes bids Feb. 4 on road work which will require moderate tonnages. These include a bridge over Black river, near Elyria, Lorain county, which also will require 1200 tons of structural shapes. Fabricated prices are easy.

Chicago — Awards are confined principally to individual lots of less than 100 tons, but the aggregate of these is large. Business prospects are good, the volume of pending orders being the largest for this period in several years, most of the tonnage being for public works. Orders for 1500 tons of bars for Chicago district sewers are expected to be placed shortly. Shading of regular market prices continues common.

Seattle—Inquiry continues active and considerable business is pending. Awards of importance have been delayed by rejection of bids in a number of cases as figures exceeded estimates.

San Francisco—American Concrete & Steel Pipe Co. booked 6661 tons for precast pipe for the metropolitan water district, Los Angeles, and 3226 tons for wash siphons for the All-American canal at Yuma, Ariz. The Los Angeles award is in addition to the 8550 tons reported recently. Blue Diamond Corp. Los Angeles, took 1256 tons for the treasury department, bid No. 1256, Los Angeles. Pending business exceeds 26,000 tons. Bids have been opened on 4498 tons for the Fort Peck, Mont., dam.

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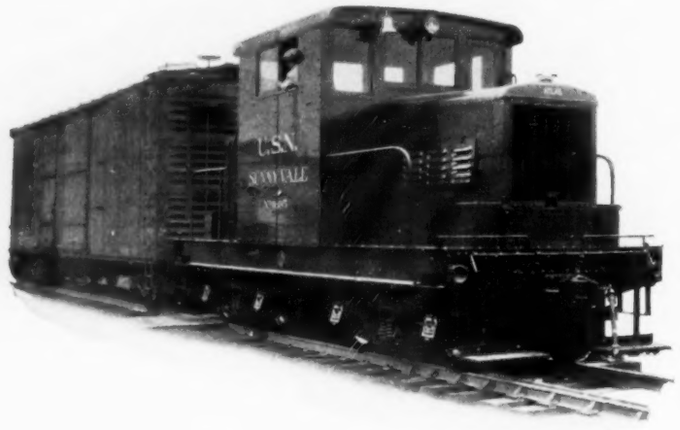

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Reinforcing Steel Awards

6661 tons, precast pipe, specification 137, metropolitan water district, Los Angeles, to American Concrete & Steel Pipe Co., Los Angeles.

1256 tons, treasury department, bid 1256, Los Angeles, to Blue Diamond Corp., Los Angeles.

Concrete Awards Compared

	Tons
Week ended Jan. 27	12,888
Week ended Jan. 20	13,543
Week ended Jan. 13	9,352
This week, 1935	7,940
Weekly average, 1935	6,862
Weekly average, 1936	9,055
Weekly average, December	8,282
Total to date, 1935	17,927
Total to date, 1936	36,223

755 tons, pumping units, specification 133, metropolitan water district, Los Angeles, to unnamed interest.
453 tons, crossing at Tracy, Calif., to Concrete Engineering Co., San Francisco.
450 tons, Conrad school, Philadelphia, to American Steel Engineering Co., that city.
400 tons, school foundation, Ninth and Mifflin streets, Philadelphia, to Concrete Steel Co., New York.
390 tons, crossing at Calwa, Fresno county, California, to Bethlehem Steel Co., San Francisco.
375 tons, school, Green and Haines streets, Philadelphia, to American Steel Engineering Co., that city.
300 tons, foundation, school, Twenty-second and Lehigh streets, Philadelphia, to Taylor-Davis Inc., Philadelphia.
250 tons, crossing, Charter Way, Stockton, Calif., to Kyle & Co., Fresno, Calif.
230 tons, for New York Central grade crossing elimination, Carmen, N. Y., to Albany Steel & Iron Co., Albany, N. Y. through Foley Brothers, New York.
200 tons, two school projects, Cleveland, to Patterson-Leitch Co., Cleveland.
177 tons, bridges in six counties in New Mexico, to unnamed interests.
172 tons, highway work, Solano and Napa county, California, to Soule Steel Co., San Francisco.
150 tons, dormitory, Teachers College, Tempe, Ariz., to Truscon Steel Co., Los Angeles.
130 tons, Chelsea creek bridge, Boston, to Bethlehem Steel Co., Bethlehem, Pa.
123 tons, state bridge in Quay county, New Mexico, to unnamed interest.
116 tons, crossing, Palo Alto, Calif., to Concrete Engineering Co., San Francisco.
100 tons, foundation, junior college, Sacramento, Calif., to Truscon Steel Co., San Francisco.
100 tons, crossing, Broadway Terrace, Oakland, Calif., to W. S. Wetenhall Co., San Francisco.
100 tons, Hampton Brewing Co. addition, to Concrete Steel Co., New York.

Reinforcing Steel Pending

4498 tons, Fort Peck dam, Montana; bids opened at Kansas City, Mo., by United States engineers.
2500 tons, federal housing project, proposal 518, Branchville, Md., bids opened in Washington, Jan. 21.
1011 tons, placing, Iron Mountain pumping plant, metropolitan water district, Los Angeles; Clyde W. Wood and M. J. Bevanda, Stockton, Calif., low on general contract.
435 tons, science building, auditorium, and stables, University of Arizona, Tucson, Ariz.; bids opened.
450 tons, four highway bridges, scattered locations, state of Wisconsin; bids close Feb. 4.
338 tons, central pumping reservoir, San Francisco; bids opened.
265 tons, over-crossing, Parkwater, Spokane county, Washington; bids opened.
200 tons, senior high school, University City, Mo.; Woerman Construction Co., St. Louis, general contractor.
199 tons, crossing, Grand Junction, Mesa county, Colorado; bids opened.
133 tons, warehouse for port commission, Stockton, Calif.; bids opened.
100 tons or more, addition to Sedro-Woolley state hospital, Washington; S. C. Erickson, Tacoma, Wash., general contractor.
100 tons or more, state overpass, Bonner county, Idaho; Arnett & Son, Boise, Idaho, general contractor.
100 tons, for building for Maltvie Chemical Co., Newark, N. J.; bids asked.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 65

Bolt, nut and rivet demand is moderately less active, with new business still somewhat restricted by anticipatory buying by jobbers and some consumers last quarter.

Business from railroads in the Chicago district, while more active than a year ago, still is spotty and the anticipated increase in requirements of freight car builders has not yet developed. Farm implement manufacturers, however, continue to take bolts, nuts and rivets at a steady rate, with production by most interests heavier than a year ago.

At Cleveland, orders from automobile manufacturers are beginning to taper, but demand from miscellaneous sources is taking up the slack, and vol-

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ume so far this month is equal to that in the comparable December period. Considerable improvement is noted in the price structure contrasted with two months ago.

Tin Plate

Tin Plate Prices, Page 64

Pittsburgh—Pickup in the volume of specifications coming to tin mills here, noted last week, is continuing, but as the end of even this extended tin plate season approaches, the district operating rate is about 10 points lower, or around 60 per cent of capacity. Canners still are hesitant to put their new trade prospects into tonnage figures to lay before the mills.

Cleveland — Owens-Illinois Glass Co. has acquired the Enterprise Can Co., Pittsburgh, and the Tin Decorating Co., Baltimore, at a reported price of $6,000,000, with a view to manufacturing tin plate containers. Some of the Standard Oil Co. units are using fiber containers for oils instead of tin cans.

New York—Following a few weeks of seasonal dullness, tin plate specifications are expected to improve shortly. Producers' carryover of approximately 4,000,000 boxes is not considered excessively large. Much of this tonnage is already under contract for release as the canning season approaches.

COMPRESSOR TANK . . .
DEEP DRAWN SEAMLESS
. . . By HACKNEY

The above compressor tank is completely seamless. Brackets and handles are welded on. This method of manufacture means uniform temper and thickness. A smooth surface that takes a fine painted finish is obtained.

To meet particular requirements in tanks, shells and special shapes, Hackney uses the deep-drawing process to provide containers that are seamless in construction.

Where welds are necessary, the special Hackney welding method insures uniform strength and a smooth appearance.

Hackney forms deep drawn shapes and shells from many metals in addition to steel, including: stainless steel, Monel metal, nickel, Herculoy, aluminum, brass, bronze, copper and various alloys.

We suggest sending blue prints or specifications of your requirements in special shapes. It is possible that Hackney engineers can suggest more efficient and economical methods of meeting your needs.

PRESSED STEEL TANK COMPANY

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1387 Vanderbilt Concourse Bldg., New York
688 Roosevelt Bldg., Los Angeles, Calif.

Hackney
MILWAUKEE

DEEP DRAWN SHELLS AND SHAPES

Pig Iron

Pig Iron Prices, Page 66

Pittsburgh — Due to the continued inactivity of gray iron foundries, sales are infrequent and are confined largely to small lots. The most active grades are No. 2 foundry and some low phos material for steel foundry use. Shipments are fair. Jones & Laughlin Steel Corp. has resumed operation of another blast furnace at its Aliquippa works, making 29 active out of 61.

Cleveland—Sales of merchant pig iron so far this month about equal shipments, which are 50 to 60 per cent of the tonnage moved in December. Except in the automobile industry, the melt apparently is close to the December level. Railroads, agricultural implement, machinery and heating equipment manufacturers are active.

Chicago — Consumption continues near the peak of the past six months, while new business remains in fair volume considering the sizable lots acquired by foundries last quarter. A larger volume of new orders is looked for within the next four to six weks. Farm implement manufacturers continue to experience best operations of leading consumers, though producers of automotive castings shortly are expected to increase their schedules in anticipation of heavier assemblies late in February.

New York—Sellers are winding up a quiet month. In some quarters, business has proved better than anticipated, but generally speaking, shipments have been light because of the heavy movement in the closing weeks of 1935. Some of this low-price tonnage still is being delivered, the Dec. 31 deadline for shipments not having been strictly observed in all cases.

Philadelphia — Specifications continue to be comprised chiefly of small fill-in tonnages. While foundry operations appear to be expanding, this situation to date has had relatively little bearing on tonnages, although promising an earlier revival than might otherwise be expected. In addition to going to district pipe makers, some of the Russian pig iron which arrived at this port recently is said to be scheduled for eastern Pennsylvania stove makers.

Buffalo—Demand is improving

steadily, and January sales and shipments will exceed expectations by a comfortable margin. Great difficulty in handling iron from piles was encountered this week, due to weather conditions. Seven furnaces continue in production here.

St. Louis — The month to date has witnessed a sharp recession in shipments, due chiefly to the heavy movement during the two final months of 1935. The melt as a whole has receded somewhat, owing to reduced activities at stove foundries. Producers of automotive castings report negligible releases for new business. Steel mills have reduced schedules for making ingots, as compared with earlier in the month, while traction and implement manufacturers have maintained their recent pace.

Birmingham, Ala. — A strong market warrants steady production and prompt delivery. Many spot orders are being booked. Twelve blast furnaces are active. Prices are firm.

San Francisco — Demand for foundry iron has shown improvement during the past few months and total consumption for the year 1935 was close to 40 per cent ahead of that for 1934. Foundries in the Los Angeles district are now operating on good schedules and the future looks bright.

Toronto, Ont. — Merchant sales are increasing steadily with awards for the week totaling 1000 tons. Basic is moving slowly, although consumption by the mills is heavy. Prices are firm.

Scrap

Scrap Prices, Page 67

Pittsburgh—Shipments and sales of blast furnace material and cast iron car wheels have picked up in this district, but in general, cast iron scrap is still slow. Advances of 25 cents have been made in cast borings, iron car wheels, and mixed borings and turnings and a similar advance is noted also in heavy low phos plate scrap and low phos punchings, and railroad springs have been increased 50 cents a ton. Heavier grades are still difficult to obtain at current quotations and sellers are loath to commit themselves on the present strong market.

Chicago—Scrap is quiet following a mill purchase of heavy melting steel a week ago. Dealers were forced to suspend yard operations for several days last week because of snow and low temperatures. In the meantime prices remain firm, with some adjustments as a result of the recent 25-cent increase in heavy melting steel.

New York—The past week was the worst the scrap trade here has known in years and more snow than scrap was handled. These conditions have made scrap a little tight and prices on several grades have been advanced. Mixed borings and turnings are bringing $3 to $3.50 for shipment to Pittsburgh. Heavy breakable cast is bringing $8 to $8.25 and grate bars $5.50 to $6, both for eastern Pennsylvania consuming points. Prices on scrap for export also are up, No. 1 heavy melting steel being quoted at $9.25 and No. 2 or auto at $8.25, delivered on New York or Brooklyn docks.

Philadelphia—A stronger trend is noted in scrap prices here. Sellers who recently booked orders for No. 1 steel at $12.50, delivered, are now having to pay that price to cover; they are also having to pay as high as $11.25, delivered, for orders for No. 2 steel taken at no more than $11.50, delivered. There have been no recent consuming orders for steel at prices higher than those above mentioned. In certain other important grades, such as heavy breakable cast, prices have advanced on consumer buying. A factor in current strength is severe weather, which has made the handling of scrap difficult.

20 Seconds of Facts On Heat Treating Profits

HERE is a heat treating fact worthy of investigation: Records show that many complete new Morrison installations have entirely paid for themselves out of operating savings within the first year. Other savings passed along to subsequent operations through more uniform and more efficient production add still another important figure to the positive side. These savings continue year after year—savings that are probably available in your own plant. We can only point them. The rest is up to you. But we would like this opportunity.

The Morrison Engineering Company specializes in all types of heat treating and industrial baking equipment for temperature ranges up to 1400°F., including tank heaters and industrial washers.

Morrison Engineering Co., Inc.

5005 Euclid Avenue Cleveland Ohio

Most consumers of steel, both No. 1 and No. 2, are fairly well covered for the present, due to substantial buying a fortnight or so ago; hence, there is some disposition to await improved weather conditions to see if there will be a softening in prices before again coming into the market. One consumer of No. 1 steel, out of the market for several weeks, may enter for a sizable tonnage in the next 10 days or so. However, this interest is said to be in fairly good position and is known to have turned down a round tonnage two weeks ago at $12, delivered.

Buffalo—Local dealers have sold a fair sized tonnage of No. 1 heavy melting steel for $12.50 and there are unofficial reports that another consumer has bid $12.75 for tonnage. Dealers say that under existing offers it is more profitable to ship scrap on $3 freight rates from Buffalo than to sell locally. It is expected that a higher price list will be established soon.

Detroit—While prices are unchanged, lessened activity at automotive plants gives a slightly easier tone to the scrap market here. Curtailment in automotive operations is reflected in reduced offerings. The consumers market for No. 1 heavy melting steel continues $10 to $10.50.

Cincinnati—Contracts against which shipments of iron and steel scrap are now being made may provide full first quarter needs of mills, which appear to have withdrawn from the market. Scarcity of heavy material, especially No. 1 steel, helps sustain bullish attitude of dealers. Movement of scrap to steelworks is steady and in fair volume. Quotations are without change.

St. Louis—Purchasing of iron and steel scrap continues in insignificant volume, in face of which the market holds extremely strong throughout. Mills, while supposedly well covered, have been cutting heavily into reserves, and with the continuance of even present operating rates, will shortly be obliged to replenish. Dealers are bullish and are not disposed to make concessions under present offering prices.

Birmingham, Ala.—Better feeling, better demand and advanced prices are noted in iron and steel scrap. Heavy melting steel is above $9.50 and No. 1 cast is holding firmly at $11 and $12. Dealers are giving service in delivery but supplies are not large.

Seattle—The market remains unchanged with No. 1 melting for export quoted at $10.25. Although Japanese mills are overstocked, a little inquiry has come from that quarter. Local mills are buying occasionally but only selected tonnages.

Toronto, Ont.—While severe weather has hampered shipments of iron and steel scrap, local dealers state that the market is strong and sales are showing improvement. Several inquiries were received during the week for machinery cast and wrought scrap. Mills continue to take delivery of steel scrap against contract and substantial shipments are going forward regularly to Hamilton consumers. Heavy melting steel is the most active grade and demand for car wheels, axles and turnings shows new activity. While a few dealers are paying more for desirable lots others are holding to list prices. It is expected, however, that there will be an early upward revision.

Detroit's Newest Downtown Hotel

DETROIT LELAND

800 OUTSIDE ROOMS with BATH

$2.50 single $3.50 double

Famous for Fine Foods

Club Breakfasts—
30c . . . 50c . . . 75c

Lunches—
40c . . . 50c . . . 75c

Dinners—
75c . . . $1 . . . $1.25

From the moment you enter our doors you will know that here you are indeed a *guest*. You will appreciate the courteous, cheerful, but *unobtrusive* service for which the Leland is noted. You will revel in the luxury you have a right to expect in a hotel that's as modern as tomorrow's motor car. You will like the superbly convenient downtown location. We hope you will accept our invitation to make the Leland your home in Detroit.

GARAGE IN CONNECTION

(AT CASS AND BAGLEY AVENUES)

DETROIT

Metallurgical Coke

Coke Prices, Page 65

Connellsville coke sales continue to be made in small lots largely to foundries, especially in this district, although two active blast furnaces still are getting their coke from that source. The decision of the *Connellsville Courier*, as officially announced, to discontinue hereafter both its weekly and annual review of the Connellsville beehive coke trade, closes a pe-

riod of 56 years of accurate reporting. The *Courier's* figures for years have been accepted as a standard in both the iron and steel trade and the coke and coal trades. Seemingly this marks another step in the march of the by-product ovens to control the trade in which for several decades the beehive oven was dominant.

Foundries in the Chicago district continue to take fuel at about the December rate and indications are for continuance at steady prices. St. Louis suppliers find demand holding well and at Birmingham, Ala., the situation is steady.

Warehouse

Warehouse Prices, Page 68

New York—Demand for iron and steel out of jobbers' stocks has not improved. The present volume is slightly less than that which prevailed during the Christmas-New Year's holidays. Indications, however, cause the jobbers to feel that an early improvement will be forthcoming. Prices are unchanged, and the only weakness is that in galvanized sheets, due to the fact that jobbers have to cut their price on primes to meet competition from seconds of unusually high quality. Galvanized sheets are 4.30c, base, delivered, for lots up to 400 pounds, 4.16c for lots of 400 to 1499 pounds and 3.81c for lots of over 1500 pounds.

Cleveland—A slight decline was noted in new orders and tonnages by some warehouse interests during the week, but volume so far this month is heavier than in the comparable December period. Prices are steady.

Chicago—Sales are steady but lack the improvement noticed earlier in the month. Compared with a year ago, a fairly large gain is shown. Weather conditions temporarily interfered with business last week.

Philadelphia—The slight improvement which marked the close of inventory season, was short-lived, business over the past several days having consequently proved disappointing to sellers. However, January and February are usually quiet. Prices are unchanged.

Detroit—Business is off slightly from the December rate, but shows an improvement over the volume a year ago. Demand from consumers outside the automotive industry accounts for part of the pickup since last year. Bolt prices in less-case lots have been advanced from 70 and 10 off list to 70 off.

San Francisco—Demand is being well maintained and from present indications business for the year 1936 will be well in advance of that for the past year. Prices on some items have been reduced in this area as follows: Soft steel bars from 3.50c to 3.25c, shapes from 3.50c to 3.25c, plates from 3.50c to 3.25c, No. 10 blue annealed from 3.60c to 3.35c, No. 24 black sheets from 4.25c to 4.00c, No. 24 galvanized from 5.00c to 4.50c.

Cincinnati—Tonnage is considerably lighter than in December. Industrial users are specifying steadily, but other demand is unimpressive. Prices are unchanged.

St. Louis—Volume as a whole is fairly well maintained. Seasonal items are moving, particularly tubing and certain grades of sheets. Railroad demands have broadened during the past several weeks, especially for track and shop supplies.

Seattle—Buying has not resumed in volume following the holidays but improvement is expected soon. No item is in particular demand although sheets, principally galvanized, for construction and repair jobs are moving freely. Most of the turnover is out of stock, with occasional mill orders. Prices are unchanged.

SPECIAL SEAMLESS SHELLS AND SHAPES

DEEP DRAWN TANKS, BOTTLES, ETC.

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This Square Seamless Drawn Tank is

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MADE FROM 1/4" STEEL

12 1/2" DEEP 6 7/8" SQUARE

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Send Us Your Next Specification

THE CROSBY COMPANY

BUFFALO, N. Y.

NEW YORK — CHICAGO — PHILADELPHIA — DETROIT — CLEVELAND

Steel in Europe

Foreign Steel Prices, Page 68

London — (*By Radio*) — Further buying of pig iron in Great Britain is held up by negotiations of the coal trade with the miners' federation. An increase in production is certain as soon as a settlement of the mining difficulty is reached. All sections of the steel trade are operating actively. New Zealand has placed a large contract for railroad material.

The Continent reports export trade is slightly more active, especially in semifinished and ship plates. India is buying steel bars.

Ferroalloys

Ferroalloy Prices, Page 66

New York—Ferromanganese shipments are being well sustained, and with better steel production in prospect as the quarter advances, the movement should later increase. The market is steady at $75, duty paid, eastern seaboard.

Nonferrous Metals

Nonferrous Metal Prices, Page 66

New York — Nonferrous metals continued to give a good account of themselves last week, both statistically and pricewise. Sentiment was still buoyant in view of further active shipments to consumers.

Copper—Sales maintained a fair pace while all domestic producers quoted unchanged levels on the basis of 9.25c, Connecticut, for electrolytic. The advance in the export copper price to around 8.80c, c.i.f. European ports, from 8.55c earlier in the week, supported views of many observers that higher levels will be established in the domestic market by at least mid-February.

Lead—Business was again done on the basis of 4.35c, East St. Louis, but one leading producer limited its business radically to a few regular customers. The market tone was strong.

Zinc—Appearance of some competitive inquiry Thursday prompted hopes that this will prove to be a forerunner of more active inquiry over the immediate future. Sellers quoted prime western unchanged at 4.85c, East St. Louis.

Tin—Prices fell to lower levels, although the sharp rise in sterling exchange supported the market slightly. Weakness was due chiefly to London declines, but some selling pressure occurred here. Straits spot closed around 46.12½c.

Antimony—Chinese and American spot antimony were both quoted unchanged at 12.62½c, New York, in a dull market.

Cold Finished

Cold Finished Prices, Page 65

Pittsburgh—Cold-finished bars, in spite of lessened automotive demand are bringing increased total tonnage, principally from miscellaneous sources, in spit of the heavy business placed in December. January tonnage promises to equal that of December. This indicates the recent price revision has not affected ideas of buyers adversely. Better automotive demand is expected soon.

Quicksilver

New York—Quicksilver prices are firm but unchanged from a week ago in a quiet market. Prices range from $77 to $79 a virgin flask, depending on quantity, lots of 15 to 25 flasks holding at $77.50 to $78.

Hanna Furnace Corp. is removing its Detroit office to the Great Lakes Steel Corp., Ecorse, Mich., effective Jan. 27.

Behind the Scenes with STEEL

Ersters

WHILE the varmints are still in season, we had better let you read, in part at least, the "autobiography of an oyster" as blottered by W. F. Libby Inc., New York erster house. Oswald Oyster now speaking:

"I am born without jaws or teeth, but I've got fine muscles, liver and a heart. In each year of my life I produce 1,200,000 eggs; each of my children is 1/120th of an inch in length . . .

". . . In Ceylon I sometimes grow to a foot in length. One of me there makes a stew when I am half a foot broad. I am not much account in England, unless I am imported there from America.

". . . I am about the only animate thing that can be eaten with impunity in a raw state. Parasites cannot exist in me as they can in chops and steaks and fruits. I am a pretty good friend to man; and to woman. Look at the pearls I've given her. Thackeray has compared me in a raw state to a new baby; yet I never kept him awake nights.

"I'm not half bad in a stew; but as a roast in the shell, all the poetry in me comes out. The clam is like the driver of a hansom cab then—not in it with me. The clam! That commonplace fellow! I avoid him as much as possible. I am not a snob, nor yet a cad, but I really must not be expected to fraternize with the clam. . ."

We're glad we missed that clambake last fall, now that we've heard from Oswald.

* * *

Prosperity Plus

PRESIDENT of a Pennsylvania manufacturing concern wrote in to tell us the happy story of his company's progress in the past few years. It's a great tonic for blues singers. He says, with becoming modesty:

"Our plant has been working 24 hours per day, three shifts, seven days a week now, since the panic started five or six years ago, and we have more than tripled or quadruplicated our production per year and expect to double our production this year over last year.

"The business is owned by the writer and is managed by my three sons.

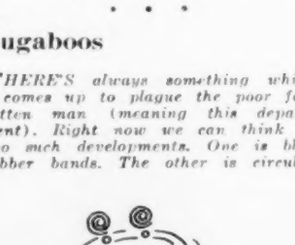
"Please do not attribute our growth as mentioned above to the Democratic administration, NRA or the New Deal. If the writer had his way he would declare an open season on the 'nuts' in Washington, the same as we have an open season on deer hunting and rabbit hunting in the fall in Pennsylvania."

One thing about that last, it wouldn't take much powder. Most of the boys appear to be half-shot already. But we know a much more effective ammunition. Votes!

* * *

Bugaboos

THERE'S always something which comes up to plague the poor forgotten man (meaning this department). Right now we can think of two such developments. One is blue rubber bands. The other is circular



paper clips. "Kurly Klips," they call these coiled nuisances; and, as if that weren't bad enough, the "Klips" have been adopted as the official badge of the "Music Goes Down and Around" clubs. Some 5,000,000 already on coat lapels, they say.

All we need now, to complete our assortment of desk monstrosities, is a streamlined pastepot and an air-conditional ash tray.

* * *

No Encomiums

W. A. WARRICK, mechanical engineer with the Diamond Chain & Mfg. Co. says he agrees with John Mohun's comments in this department for Dec. 23, and further says he will "carefully refrain from adding to the encomiums of other of your subscribers, but we will add that so far the contents of *Power Drives* have been quite sound. (Emphasis by understatement.)"

That word "encomiums" had us in a dither for a moment but we snapped out of it quickly. If he had only said "panegyrics" we might have caught on more quickly.

—SHRDLU

Died:

(*Concluded from Page* 26)

known is the scleroscope, for determining the hardness of metals.

Mr. Shore was a member of the American Society for Metals and had contributed to its meetings many monographs on the physical properties of metals.

♦ ♦ ♦

John Glessner, 93, director and former vice president, International Harvester Co., Chicago, Jan. 20. He became president of a firm which later merged with others to form the International Harvester organization.

♦ ♦ ♦

Frederick Rollins Low, 75, editor emeritus of *Power*, and past president of the American Society of Mechanical Engineers, in Passaic, N. J., Jan. 22. He was chief editor of *Power* for 42 years, becoming editor emeritus in 1930.

♦ ♦ ♦

Ferdinand Glueck, 75, for 49 years superintendent of the Harrison Machine Works, Belleville, Ill., manufacturer of threshing machines, in that city, Jan. 21.

♦ ♦ ♦

James A. Meissner, 38, superintendent of blast furnaces for the Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., in Birmingham recently.

♦ ♦ ♦

Thomas F. Kelly, 58, sales manager, Witherbee Sherman Corp., Port Henry, N. Y., in Minesville, N. Y., near Port Henry, Jan. 23.

Born in Latrobe Pa., he was graduated from Carnegie Institute of Technology in 1902. He was one-time superintendent of blast furnaces for the Jones & Laughlin Steel Corp., Pittsburgh, and later held similar positions with the Lackawanna Steel Co., Buffalo, and with M. A. Hanna Inc., Buffalo. He was subsequently consulting engineer for the Brassert Steel Co., Chicago, which affiliation he severed when he became superintndent of blast furnaces at Port Henry late in 1926. He had been sales manager for the Witherbee Sherman Corp. for two years.

He was a member of the American Iron and Steel institute and of the United States Blast Furnace association.

♦ ♦ ♦

Frank A. Power, 63, chief clerk of the Edgar Thomson works of Carnegie-Illinois Steel Corp., Pittsburgh, at Pittsburgh, Jan. 17. Mr. Power was born in Conneautville, Pa., and started working at the Edgar Thomson works in August, 1890, as a time taker in the blast furnace department. In September, 1906, he was appointed assistant chief clerk and was made chief clerk on April 1, 1928.

♦ ♦ ♦

A. B. Shepherd, 75, vice president in charge of ore of the Jones & Laughlin Steel Corp., Pittsburgh, Jan. 24. He had been with Jones & Laughlin 25 years, and had been a director since 1928. He was head of three Jones & Laughlin subsidiaries—Interstate Steamship Co., Interstate Iron Co., and Jones & Laughlin Iron Co. Before going with Jones & Laughlin Mr. Shepherd was head of the Pittsburgh water bureau.

Record Crowd at Canners Meeting

RECORD-BREAKING attendance was reported at the annual joint convention of the National Canners association, the Canning Machinery and Supplies association, and the National Food Brokers association, at Chicago last week.

Attendance at the machinery and equipment show staged by the Canning Machinery association was reported as the largest in several years.

Investigate
PERMITE ALUMINUM CASTINGS
for these
EXTRA ADVANTAGES
1 LIGHT WEIGHT.. Only two-fifths as heavy as cast iron.
2 STRENGTH .... Two to three times as strong as ordinary gray iron.
3 SOUNDNESS.. No internal defects.
4 SMOOTHNESS.. Require little polishing and finishing.
5 ACCURACY .... Uniformly close dimensional tolerances.

YOUR casting problems may be different from those of any of the manufacturers whose products are pictured here. But, in any event, the possible savings or improvements to be made through the use of Permite Aluminum Alloy Castings deserve your investigation. Just send us your blueprints for recommendations and quotations.

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PERMITE *Aluminum* ALLOY **CASTINGS**

Permanent Mold ★ Semi-Permanent Mold

More than 25,000 attendance, delegates and guests, was estimated.

Sessions of the Canners association took up problems vital to the canning and packing industry. Most of these sessions were in the form of group meetings where questions of pertinent interest to particular groups were discussed. These problems involved the growing, processing and manufacturing of products.

Some 125 canning machinery and equipment suppliers had exhibits, many of them working, at the equipment show. A beer packaging machine exhibited by the Standard Knapp Corp. commanded unusual interest. Other displays included those of the American Can Co., Continental Can Co., Aluminum Cooking Utensil Co., Aluminum Seal Co., American Utensil Co., Max Ams Machine Co. Angelus Sanitary Can Machine Co., Anchor Cap & Closure Co., Automatic Canning Device Inc., Bernardin Bottle Cap Co., Container Corp. of America, Cameron Can Machinery Co., Crown Cork & Seal Co., Elwell-Parker Electric Co., Heekin Can Co., Kiechkhefer Container Co., Lee Metal Products Corp., Link-Belt Co., Liquid Carbonic Corp., International Nickel Co., Inland Container Co., National Can Co., Phillips Can Co., Western Can Co., Taylor Instrument Cos., Westminster Machine Works, and Republic Steel Corp.

An extremely large volume of machinery and equipment business was reported booked at the show. The canning industry was said to have experienced its best year in history in 1935 and now is modernizing and re-equipping. Improved machinery developed over recent years has eliminated almost entirely human handling of food in canning. Something like a $30,000,000 backlog of equipment business is reported in the industry.

Neal S. Sells, manager of the Sprague-Sells division of the Food Machinery Corp., was elected president of the Canning Machinery and Supplies association; Thad Searles, general sales manager of the American Can Co., vice president, and Sam Gorsline, secretary.

Urge Trained Personnel For Public Service

A nation-wide publicity drive was inaugurated Jan. 3 by the National League of Women Voters, 726 Jackson place, Washington, to interest industrialists and agriculturists in a campaign for trained personnel in public service.

Trained speakers are going before industrial, agricultural and other individual groups to further the objective of the campaign, the slogan of which is "Find the man for the job, not the job for the man."

Committees have been formed in various cities to educate and interest the public to a viewpoint of efficiency and good government and to awaken voters to the dangers of continuing the spoils system in government. These committees desire to arouse citizens to a recognition that competent government is impossible without the permanent service of a qualified personnel chosen on a merit system.

The drive seeks to influence taxpayers to demand a change in the type of public service for which they are now paying unnecessary millions of dollars because of waste and extravagance.

The drive will culminate in special dinners in important cities, Wednesday, Jan. 29.

Michigan Leather Packing Co. Marks 25th Anniversary

Michigan Leather Packing Co., Detroit, this year is celebrating its twenty-fifth anniversary, having been founded in 1911.

Beginning with simple forming operations in leather for limited applications, the company's products have become highly developed and specialized, and placed in numerous kinds and types of applications.

Design and engineering, technical research and experimentation, chemical and physical processing, unheard of years ago, are today employed in the manufacture of the company's mechanical leather packing and oil seals.

Union Iron Works, of Erie, Is Not Consolidated

The Union Iron Works mentioned in an account in STEEL, Jan. 20, page 12, of the program of the Bethlehem Steel Corp. for merging its subsidiaries did not refer to the Union Iron Works, of Erie, Pa.—or, for that matter, to any other Union Iron Works except that operated by Bethlehem. The Union Iron Works, of Erie, was organized in 1890, and builds high pressure steel boilers and other power plant equipment.

Announces Bridge Contest

American Institute of Steel Construction Inc., 200 Madison avenue, New York, has announced its eighth annual bridge design competition. A design for steel highway bridge must be submitted for preliminary judgment April 15, with the final decision May 13. First prize is $100 in cash; second, $50.

Safety

AMERICAN Foundrymen's association, Chicago, has organized a safety and hygiene section in charge of E. O. Jones, for many years with the Belle City Malleable Iron Co., and Racine Steel Casting Co., Racine, Wis., and for the past three years consultant of the industrial relations bureau of the National Founders association. He will have headquarters at A.F.A. offices, 222

ANOTHER CALOREX PRODUCT

REG. U.S. PAT. OFF.

SMALL CAPACITY COMBINATION—LIQUID FUEL —GAS BURNER

Oil burner protecting shield eliminates withdrawal of liquid fuel burner from firing position during gas firing.

Presented by

W. N. BEST ENGINEERING CO.

Evening Post Bldg., New York, N. Y.

Estab. 1890

Manufacturers of Industrial Oil, Tar, Gas and Combination Fuel Burning Equipment

WRITE US DIRECT ON ANY OF YOUR FURNACE FIRING PROBLEMS

West Adams street, Chicago. Mr. Jones' program is:

To determine further the extent of hazards to safety and health in the foundry industry; to study causes of hazards and methods of prevention, and to provide further protection to workers against exposure.

Co-operation with other centralized agencies of industry confronted by similar problems, in assembling and making available information on this subject.

Co-operation with public health agencies, insurance carriers, and the medical profession in forwarding health measures.

Assisting in standardization of dust elimination equipment and improvement of shop operating conditions in the foundry industry through active educational work.

Promoting standards for dust elimination and control equipment, in co-operation with agencies of the manufacturers of such equipment.

Giving encouragement by active means where enactment of equitable and fair compensation laws is sought in industrial states.

REPUBLIC COAL MINES SAFE

Six coal mines, comprising the Republic Steel Corp. operation near Uniontown, Pa., produced 1,929,461 tons of coal in 1935 without a fatal accident. The Republic mines, which employ 1500 men, also reduced the total number of lost time accidents in 1935 by 68 per cent. Accident frequency for the year was 31.84 and accident severity 2.58. E. B. Winning is manager of the Uniontown operations for Republic, and J. L. Hamilton is safety engineer. Superintendent Robert McVicker and men of the Russellton mine were awarded a trophy for the best record in the Republic group.

Meetings

BLAST FURNACE AND COKE ASSOCIATION of the Chicago district will hold its second regular meeting of the 1935-1936 season at the Hotel Shoreland, Jan. 28. The technical session will start at 2:30 p.m., the program consisting of five papers covering blast furnace and coke oven practice. Dinner at 6:30 will be followed by an address by Donald McGibeny, National Broadcasting Co. B. A. Standerline, Wisconsin Steel Co., South Chicago, Ill., is secretary-treasurer of the association.

HEATING AND VENTILATING EXPOSITION ON AT CHICAGO

Fourth International Heating, Ventilating and Air Conditioning exposition opens Jan. 27 at the International amphitheater, Chicago. More than 300 manufacturers and suppliers of the industry will be represented with exhibits. The exposition is sponsored by the American Society of Heating and Ventilating Engineers, which will hold its forty-second convention at the Palmer House. Co-operating in the exposition is the National Warm Air Heating and Air Conditioning association. The exposition will end Jan. 31.

Foreign Trade

IRON and steel exports from the United States in December, 1935, according to the metals and minerals division of the department of commerce, were 239,264 gross tons, an increase of 16.9 per cent over November but a decline of 15.3 per cent from December, 1934. Total exports for 1935 were 3,771,677 tons, compared with 2,832,764 tons for all of 1934. Increases for December were shown in steel and iron scrap, at 142,135 tons; tin plate, at 18,923 tons; galvanized steel sheets, at 7791 tons; heavy rails, at 7110 tons. Losses were registered in skelp, at 3290 tons and black steel sheets, at 7671 tons.

Rules on Patent

The Supreme Court of the United States, on Dec. 9, 1935, refused to review the decision of the lower courts in a suit brought by Joseph T. Ryerson & Son against the Bullard Co. under Conradson Patent No. 1,-

"A.W." Super-Diamond
for THE U.S. NAVY
Uncle Sam's "watch dogs" are now using the new "AW" Super-Diamond Pattern! A typical choice—emphasizing the desire to provide the Navy with every safeguard. For "AW" floor plates *are* safe—and permanent.
Be sure your floor plates are really safe—specify "AW" plates. Also available in the reliable standard *Diamond* and *Diamondette* patterns—ferrous and non-ferrous metals.
ALAN WOOD STEEL CO. ESTABLISHED TRADE "A.W." MARK 1826 CONSHOHOCKEN, PA.
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140,299. Both lower courts had held the Conradson patent invalid.

Financial

FIRST of the integrated steel producers to report for the last quarter of 1935, Gulf States Steel Co., Birmingham, Ala., discloses a net profit of $119,350, after charges, compared with profit of $58,433 in the third quarter, and a net loss of $44,468 in the December quarter of 1934. Gulf States is generally believed to be the interest which the Republic Steel Corp., Cleveland, is negotiating for. Republic for some time has owned upward of 75,000 of the 197,500 common shares of Gulf States.

DIVIDENDS DECLARED

Chain Belt Co., Milwaukee, 30 cents on the common, Feb. 15 to record of Feb. 1. In 1935 quarterly dividends of 15 cents a share, plus an extra of 70 cents, were paid.

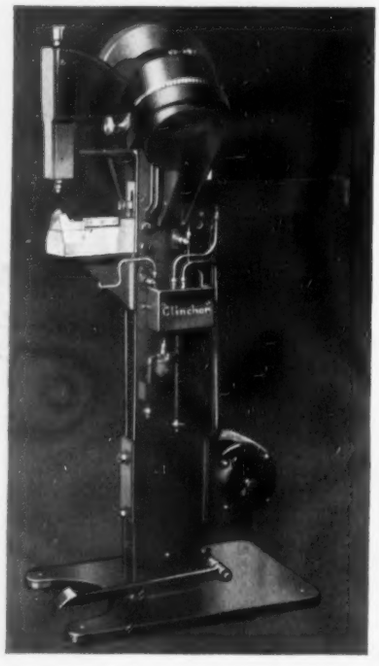
Fairbanks, Morse & Co., Chicago, initial quarterly of $1.50 on the new 6 per cent preferred, March 2 to record of Feb. 11.

Iron Fireman Mfg. Co., Portland, Oreg., and Cleveland, 25 cents March 1, June 1, Sept. 1, and Dec. 1, 1936. Last year's earnings approximated $627,500.

Signode Steel Strapping Co., Chicago, quarterly of 21½ cents, Feb. 5 to record of Feb. 1—first payment since Jan. 14, 1931.

Standard Steel Spring Co., Coraopolis, Pa., 25 cents Feb. 5 to Jan. 31 record. The company has been paying this amount quarterly.

United States Pipe & Foundry Co., Burlington, N. J., 37½ cents April 20 to record of March 31. In previous quarters 12½ cents has been paid. Outstanding first preferred has been called at $21 plus 20 cents in accrued dividends Feb. 29. Preliminary report shows earnings of $1,169,070 in 1935, against $818,068 in 1934.



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A new type of machine answering the demands for better production methods for setting Clinch Nuts.

The clinch nut, which has been automatically placed on the anvil, locates the work. The ram coming down sets the clinch nut.

May we send you a circular describing the many details so important for successful production?

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Activities of Steel Users and Makers

EFFECTIVE Jan. 25, the general offices of Republic Steel Corp. were formally removed from Youngstown, O., to Cleveland. The new offices occupy floors 13 to 16 inclusive in the former Medical Arts building, recently renamed the Republic building.

The move consolidates the general offices which have been located in Youngstown, the executive and Cleveland district sales offices formerly in the Union Trust building, Cleveland, and the advertising department, which has been in Massillon, Ohio. The sales offices of the Newton Steel Co. also are located in the Republic building, Cleveland.

The departments affected in the move include general operating, general sales, treasury, purchasing, accounting, credit, claims, ordering, coding, traffic, patent, advertising and sales promotion, sheet and strip sales, pipe sales, bar sales, tin plate sales, railroad sales, culvert sales, pig iron and by-product sales, engineering, industrial engineering, salvage and reclamation, and industrial relations.

The sales offices of the alloy steel division of Republic will remain in Massillon.

Crescent G. Medley continues in charge of the Youngstown district sales office, with headquarters in Youngstown. A native of Warren, O., he was graduated from Warren high school and attended the University of Michigan and Syracuse university. He began his career in the mills of the Trumbull Steel Co., now a unit of Republic. Working in the mills and offices, Mr. Medley was rapidly promoted, and was appointed district sales manager in June, 1934. He has been connected with the steel industry for about ten years.

Scrap's Service to Industry Lauded

(*Concluded from Page* 15)

source of data of this character.

"You can give no information, of course, concerning the nature of the quantities of material, apparently increasing, which go direct from the producer to the consumer. However, a statistical analysis, rough though it may be, of the industrial source of ferrous scrap going through your hands would be highly significant."

Benjamin Schwartz, director general of the institute, spoke briefly on "A Plan to Reduce Compensation Insurance Costs." This was followed by an address by H. E. Leichenger on "What the Social Security Laws Mean to the Scrap Dealer." Mr. Leichenger analysed the effect of the new social security laws on the scrap dealers. Dr. Max Gerber then presented a paper on the "International Scrap Market."

Other speakers were Morris Machlin, Machlin Bros. & Bassow, Inc., New York; Joel Claster, Luria Bros. & Co., Inc., Philadelphia, president of the Institute; I. W. Solomon, I. W. Solomon Co., Pittsburgh; Richard V. Bonomo, L. Schiavone-Bonomo Corp., Jersey City; David H. Cohen, D. H. Cohen, Inc., St. Louis; Maurice D. Friedman, the M. D. Friedman Co., Ashland, Ky.; I. Guy Shapiro, Columbia Iron & Metal Co., Cleveland; Ben Kaplan, M. S. Kaplan Co., Chicago; Maurice Schlafer, Schlafer Iron & Metal Co., Detroit; Michael V. Bonomo, Schiavone-Bonomo Corp., New York; John Hunt, M. J. Hunt's Sons, Philadelphia.

Feature of the convention was the luncheon given in honor of Mr. Tower which was attended by the board of directors of the institute and a number of invited guests.

Just prior to the close of the convention the election of officers was announced as follows: Darwin S. Luntz, Luntz Iron & Steel Co., Canton, O., president; Michael Bonomo, Schiavone-Bonomo Corp., New York,

vice president; Walter Erman, of Erman-Howell & Co., Chicago, secretary; and Thomas F. Kelly of Thomas F. Kelly Co., New York, treasurer.

The new board of directors is as follows: Richard V. Bonomo, L. Schiavone-Bonomo Corp., Jersey City, N. J., president, New Jersey chapter; Percy W. Bowers, P. W. Bowers & Co., New York, N. Y., president, New York chapter; David H. Cohen, D. H. Cohen, Inc., St. Louis, president, St. Louis chapter; Harry Cohen, H. Cohen & Co., Chelsea, Mass., president, Boston chapter; John Hunt, M. J. Hunt's Sons, Philadelphia, president, Philadelphia chapter; Sloan Hurwitz, Hurwitz Bros. Iron & Metal Co., Buffalo, president, Buffalo chapter; Ben Kaplan, M. S. Kaplan Co., Chicago, president, Chicago chapter; Maurice Schlafer, Schlafer Iron & Metal Co., Detroit, president, Detroit chapter; I. Guy Shapiro, Columbia Iron & Metal Co., Cleveland, president, Cleveland chapter; I. W. Solomon, I. W. Solomon Co., Pittsburgh, president, Pittsburgh chapter; Maurice Friedman, M. D. Friedman Co., Ashland, Ky., president, Cincinnati chapter; J. B. Knight, J. T. Knight & Son, Inc., Columbus, Ga., president, Southern chapter; Phil W. Frieder, Philip W. Frieder Co., Youngstown, O.; Joel Claster, Luria Bros. & Co., Philadelphia; William J. Ross, Hyman-Michaels Co., Chicago; Louis J. Borinstein, A. Borinstein, Indianapolis; David Pollock, Mayer-Pollock, Pottstown, Pa., and Barney H. Rubine, Hudson Iron & Metal Co., Bayonne, N. J.

Six standing committees were appointed as follows: public relations, legislation and research, yard dealer problems, broker problems, arbitration, finance, membership and chapter welfare.

Equipment

Chicago—Machinery and equipment business in most instances is steady or improved. This situation also is apparent outside the metal-working field. Canning machinery manufacturers, in convention here last week, did the largest volume of business in history, topping last year's record by a substantial margin. Machine tool sales continue fairly active, and January is expected to show a good increase over the December volume. Railroad inquiries for machinery and equipment, while still light, are improving. Small tool demand is holding well.

Seattle—The most active inquiry is for motors, pumps and general items involved in water and sewage disposal systems. Logging and lumber plants are making some replacements but mining machinery is out of season.

Construction and Enterprise

Ohio

BARNESVILLE, O.—United Dairy Co. conducted a general discussion of plans for the construction of a future plant here recently, to be located on the Florence Arnold farm, near Waterford, O. Construction will start as soon as favorable weather permits. Mr. Giffee and Mr. Meeker are officials of the company.

CINCINNATI—Palmer Co., St. Bernard, O., will ask bids about March 1 for the construction of a thermometer factory at Reading road and Tennessee avenue, this city. Grunkenmeyer & Sullivan, 3717 Eastern avenue, is architect.

CINCINNATI—Bids are asked for Jan. 29 by the city purchasing agent for furnishing and laying suction and discharge mains at Western Hill station, including 56 tons of special casting, and incinerator work. A PWA project.

CINCINNATI—City, Charles E. Lex Jr., purchasing agent asks bids Jan. 29 for pick-up trucks. Bids to be sent to room No. 143, city hall.

CHILLICOTHE, O.—Plans for the expansion of the plant of the Chillicothe Paper Co., calling for the erection of three new buildings, have been completed, and approximately 18,000 square feet of operation manufacturing space will be added by this project. The program calls for a specially constructed building for counting and packing operations, a building for specialty operations, and an office building, all of which will be placed so as to permit further expansion.

CLEVELAND—Hydraulic Equipment Co. has been incorporated by Hall Kirkham, Carl C. Tucker and Carter Kissell, Tolles, Hogsett & Ginn, Union Trust building, is correspondent.

CLEVELAND—Kress Chair Co. has been incorporated by Jerome B. Newman, Max Pevsner and H. Gottfried, Henry S. Gottfried, Hippodrome building, is correspondent.

COLUMBUS, O.—City, Llewelyn Lewis service director, Robert Tucker, superintendent of division of electricity, contemplates the installation of two new boilers to increase capacity of the plant, to cost $150,000 each. City officials have been asked to request a $300,000 bond issue of the council.

GALION, O.—City, L. A. Cline service director, WPA Director Earl Mist, district No. 9, Mansfield, O., contemplates furnishing 4000 feet of 4 and 6-inch cast iron pipe, valve fittings, and hydrants, for extension of water lines in Clymer, O., on Edwards and Henry streets.

LIMA, O.—A new $60,000 brewery distributing plant to supply Allen and five surrounding counties probably will be open for business March 1, at 201 South Central avenue. This announcement was made recently by Harold Thompson, manager of the local branch of Christ Diehl, Defiance, O. The purchase was made from Model

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Familiarity with detail often obscures the general principle—we can't see the woods for the trees. In many plants there are opportunities overlooked for handling materials with the continuous flow principle, which the outside view-point of Mathews engineers can and will uncover. Mathews book "Problems Solved" contains clues which will enable you to discover such opportunities for yourself. It is designed for executives. Write for a copy.

MATHEWS CONVEYER COMPANY

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Mills, and included in the outlay will be mechanical refrigeration units, new cold storage equipment, and handling facilities.

MONROEVILLE, O.—Fire of undetermined origin caused considerable damage to this city's power plant recently, the bulk of the loss being to machinery and equipment.

SANDUSKY, O.—Lake Erie Power & Light Co., this city will install new equipment here and in Ceylon, O., at a cost estimated at $60,000 to $80,000. Provisions are also being made for an emergency line should the main line fail. The company has been awarded a 25 year franchise for furnishing electrical energy to the proposed new Wheeling & Lake Erie railroad coal dumper at Huron, O.

STEUBENVILLE, O. — Wheeling Steel Corp., Wheeling Steel building, Wheeling, W. Va., plans improving and constructing additions to its plant here. Cost will exceed $500,000, with equipment.

TOLEDO, O.—City, George N. Schoonmaker service director, council finance committee, has approved the expenditure of $13,500 in additional repairs to the bridge lifting machinery. Project will mature soon.

WILLOUGHBY, O.—Ohio Rubber Co., as a part of its building program, is erecting a 1-story structure, 40 x 40 feet, adjoining the southern part of the factory. Work is being done by the C. A. White Construction Co., this city.

Michigan

DEARBORN, MICH. — American Blower Corp. has nearly completed construction of the first unit of its new plant located on Tireman avenue and the Detroit Terminal railroad. Cost of the new structure is estimated at $250,000. It is the plan of officials of the company to erect other plant structures on the same site.

DETROIT—C. C. Howarth Machinery Co., 1440 Franklin street, has been incorporated to deal in machinery, by Charles S. Howarth, 2984 Fullerton avenue.

DETROIT—Evans Walton Co. has been incorporated to deal in manufacturing devices, by Edward T. Goodrich, 3266 Penobscot building.

DETROIT—Argo Plating Co., 4317 Grand River street, has been incorporated to do a metal plating business, by I. W. Parrish Jr., 8658 Dumbarton road.

DETROIT—Lincoln Mfg. Co., 2630 Erskine street, is having alterations made on its factory by the Corrick Bros. Inc., this city.

DETROIT—Cogsdill Mfg. Co. is making additions and alterations to its factory at 6511 Epworth boulevard. Paul Sewell is architect.

DETROIT—Detroit Moulded Products Co. has been incorporated to deal in the manufacturing of plastic products, by Clarence Snyder, 1130 Berkshire road, Grosse Pointe park.

DETROIT—Star Steel Supply Co. is adding a warehouse unit to its plant at 5654 Federal avenue. The addition, 65 x 212 feet, is being built by O. W. Burke Co., this city.

DETROIT—Interstate Tool Co., 19636 Mitchell street, will build a new 1-story, 30 x 60 foot, brick and steel addition to its factory. George W. Graves is the architect.

DETROIT—Penninsular Steel Products Co., 1030 McDougall avenue, is building an addition to its present plant, 60 x 100 feet, which will be used for additional storage space and office buildings.

DETROIT—Stroh Brewing Co. is erecting a new stock cellar and wash house addition to the present plant at 997 Gratiot avenue, at a cost of $320,000. With the addition of equipment, the cost of the plant is estimated at $800,000. Harley & Ellington Inc. is engineer.

DETROIT—Bids are asked Jan. 28 by E. H. Bauer, acting secretary of the board of commissioners, for furnishing additional flow meters, water level gages and clocks, including 12 flush mounted gages, 2 surface mounted gages, 3 safety switches, 2 gage fixtures, conduit, wiring, terminal blocks, fittings, and related items for chemistry building. PWA project.

DETROIT—Ainsworth Mfg. Corp. has begun an expansion program which will replace several of its older buildings and add new units to existing structures. More than $750,000 has been appropriated out of the company's surplus for this purpose. A brick and concrete factory addition is to be erected at 2200 Franklin street. With equipment, cost of this plant and a power house will be approximately $500,000. An additional story to the present 3-story factory of the firm, located at the above address, is to be erected. Albert Kahn Inc. is the architect and Bryant & Detwiler is general contractor.

GRAND RAPIDS, MICH. — J. A. Utley, 729 Penobscot building, Detroit, has received the general contract covering construction of the new stamping division plant of General Motors Corp., Detroit. Edward F. Fisher, general manager of Fisher Body Corp., subsidiary of General Motors, Detroit, says that work will begin at once. The contract does not cover the installation of plumbing, heating, and electrical equipment, contracts for which will probably be let in the next few days. The structure must be ready for occupancy within 105 days.

MANISTEE, MICH. — Rademaker Chemical Co. has made an announcement of an expansion program to its plant, entailing an expenditure of more than $75,000.

MONROE, MICH.—The plant formerly occupied by the Sidway-Topplif Co., Washington, Pa., has been obtained by the River Raisin Paper Co., of this city, and will be used for the manufacture of corrugated shipping cases. Approximately $100,000 worth of machinery is to be installed.

Illinois

CHICAGO—Farm Power Products Co., 1323 Carroll avenue, has been incorporated to deal in farm machinery, by Max Schloss, Frank E. Sooks, and Milton D. Block. Correspondent is Cox & Moore, 135 South La Salle street.

CHICAGO — Johnson Hardwood Door Co., 13 North La Salle street, has been incorporated to do a general millwork business, by Thomas Rosenberg, Bernice Hegarty, and Harold M. Goldstein, correspondent, 33 North La Salle street.

CHICAGO—Buccola & Kasten Inc., 216 West Jackson boulevard, has been incorporated to do a general manufacturing and brokerage business, by Victor Buccola, Philip Kasten and Harry Snitovsky. Correspondent is Meyer S. Rosengard, 33 North LaSalle street.

CHICAGO—Coffee Electrost Corp., 77 West Washington street, has been incorporated to do a general manufacturing business, by M. McNamara, M. Zacksman and E. Melchione. Correspondent is Ungaro & Sherwood, 77 West Washington street.

CHICAGO—Hixco Inc., 6741 East End avenue, has been incorporated by Carl G. and Everett H. Hicks, Albert K. and Jules L. Levinstein, and Henry Weisberg, to manufacture and deal in household utensils. Beach & Beach, 111 West Washington street, is correspondent.

CHICAGO—Mutual Pipe & Supply Co.,

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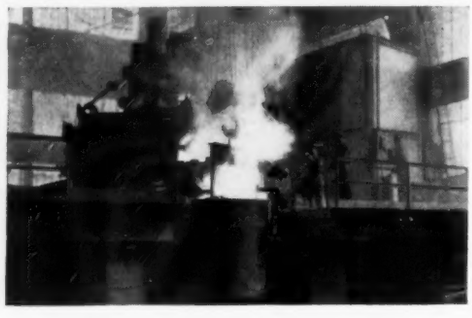

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IRVINE, WARREN COUNTY, PENNA., U. S. A.

111 West Washington street, has been incorporated to do a general pumping business, by Harry Ryan, Joseph Rofi and James Russell. Correspondent is Howard A. Brundage, 111 West Washington street.

CHICAGO—Manufacturer's Fin Coil Co., 3255 West Ogden avenue, has been incorporated to deal in mechanical and electrical devices, by M. Matlin, Charles Matlin and Alex Zuckerman. Correspondent is Branko M. Steiner, 134 North La Salle street.

MOLINE, ILL.—City council has authorized an order for two 4-ton locomotives, 40 dump cars, and 2500 railroad ties, to be used in connection with a WPA project at the municipal airport.

ROCHELLE, ILL.—Rochelle Asparagus Co. is making plans for a canning plant addition to cost $37,000 with equipment.

Indiana

ASHLEY, IND.—Town board, C. Deetz chairman, will soon take bids for constructing a waterworks system, including a turbine type deep well pumping unit, 65,000-gallon elevated steel tank, pump house, distribution system, and cast iron mains, at a cost of $90,000. A PWA project, Lennox & Matthews, 537 Architects building, Indianapolis, is architect.

INDIANAPOLIS — Fletcher Sales Co., 421 Lemcke building, wants two turbines, 500 kilowatt, noncondensing, 150-pound steam pressure, 15-pound back, 3 phase, 60 cycle.

Connecticut

BETHANY, CONN.—A. Fenwick, this city, is in the market for a bucket type sand and gravel loader.

New York

NEW YORK—R. C. Stanhope Inc., 101 West Thirty-first street, dealer, wants a steam locomotive, 10 to 15 ton, 24-inch gage, oil burning.

NIAGARA FALLS, N. Y.—Mathieson Alkali Works Inc., 2440 Buffalo avenue, is taking bids soon for a plant addition on Buffalo avenue, to cost in excess of $35,000.

WATERTOWN, N. Y.—Williams Apparatus Co. Inc. has been organized to deal in machinery, equipment, and apparatus for testing of cellulose, textiles, and chemical materials and products. Papers were filed by Williams Apparatus Co., this city.

Pennsylvania

BRACKENRIDGE, PA.—Allegheny Steel Co., this city, has acquired a site on the Allegheny river for the erection of a modern barge-loading terminal. W. F. Detwiler is executive vice-president.

EDINBORO, PA.—Proposals are being received by the board of trustees of the State Teacher's College, this city, until Jan. 29 for rebuilding transmission lines and alterations to fire alarm systems. Plans and specifications may be received at the office of Meyers & Johnson, 821 Commerce building, Erie, Pa., architect and engineer.

ERIE, PA.—Oster Mfg. Co., this city, has been granted a state charter to manufacture machinery and tools. Roger Tewksbury is president.

GLASSPORT, PA.—Proposals are being received by the borough council, W. Hays Satterfield secretary, until Feb. 10 for two 1½-ton trucks, equipped with dump bodies.

LANCASTER, PA.—Lancaster Iron Works plant was damaged to the extent of $100,000 recently.

OIL CITY, PA.—Harvey Equipment Co. has been granted a state charter to deal in equipment, machinery, and appliances, by J. M. Harvey, John Harvey, and D. L. Bowen.

PHILADELPHIA—Frankford arsenal asks bids Jan. 29 for scales; Jan. 30 for bench precision lathe; and Jan 31 for a milling machine; Feb. 4 for a blank cup punch and die; Feb. 17 for a bench drilling and tapping machine.

PITTSBURGH—Pittsburgh Engine & Gear Corp. has been granted a state charter to manufacture automobile parts. James Scott Burke is president.

WEST BRIDGEWATER, PA.—Kiernan-Courtney Coal Co. Inc. has been granted a state charter to deal in minerals. Charles Kiernan is president.

Alabama

BLACKSHER, ALA. — Henry Bryers, Stockton, Ala., and J. D. Crosby, Bay Minette, Ala., propose to install a lumber plant near this city.

Maryland

EDGEWOOD, MD.—Chemical warfare service, city arsenal, asks bids Jan. 31 for brass sheet and Feb. 13 for copper angle tubes.

ROYAL OAK, MD.—Plaindealing Boat & Engine Co. has been incorporated by William Burton and George Austin Piersol.

District of Columbia

WASHINGTON—Veterans' administration, procurement division, Arlington building, asks bids Jan. 31 for steel ice chests; Feb. 3 for compression faucets and triple head press; Jan. 30 for ventilating fan.

Florida

FORT PIERCE, FLA.—Fort Pierce Growers association, local unit of Florida Citrus Exchange, has leased a site on the harbor front for the erection of a $100,000 packing plant, with facilities for both shipping and carloading. Capacity will be 1,000,000 barrels of fruit.

JACKSONVILLE, FLA. — United States engineer, box 4970, asks bids Jan. 28 for cast chrome nickel steel ball joints and cast chrome nickel steel hinged bolts.

JACKSONVILLE, FLA. — United States engineer, box 4970, asks bids Jan. 29 for machine electric resistance welded pipe, cast steel engine side pump heads, cast iron stuffing boxes, spare steel plate stuffing box liners, spare steel plate runner mouth liners, and spare cast steel suction head liners.

ORLANDO, FLA.—Wisconsin Storage Battery Co., Racine, Wis., will recondition a building on Webber street, this city, and manufacture storage batteries to take care of its South American trade.

ST. PETERSBURG, FLA.—John H. Williams, Sans Souci apartments, 512

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PARISH PRESSED STEEL CO.

Specialists in difficult stamping design

Robeson & Weiser Sts., READING, PA.

Pacific Coast Rep.: F. Somers Peterson Co., 57 California St., San Francisco, Cal.

Dartmoor street, wants an automatic passenger elevator.

Mississippi

JACKSON, MISS.—W. J. Lewis Drilling Co. has been incorporated by W. J. and W. E. Lewis.

VICKSBURG, MISS.—United States engineer, postoffice, box 667, will ask bids Feb. 14 for a marine gasoline engine, f.o.b. Greenville, Miss.

North Carolina

LINCOLNTON, N. C.—Lincoln Knitting Mill, organized by F. C. Nicholson, Chattanooga, Tenn., and associates, proposes to install a plant for the manufacture of hosiery.

South Carolina

UNION, S. C.—Union Iron Foundry, off East Madison street, suffered a $35,000 loss by fire recently. J. M. Moss is president of the firm.

West Virginia

HUNTINGTON, W. VA.—F. C. White, room 406, 82 Wall street, New York, and Percy Groves, Brown building, Philadelphia, are interested in organizing a company to construct a coal tipple and grain elevator, with a daily output of 10,000 tons, and to be constructed partly of steel. Cost of the buildings will be about $250,000, and of the grain elevator about $1,100,000. Will install cables, winches, conveyors, etc., and the date of opening bids has not been decided. A fleet of 100 barges and 26 tugs will be placed in operation.

LOGAN, W. VA.—Guyan Machinery Co. wants power squaring shear and power brake; nibbler for 11 gage; motor generator sets, 200 and 300 kilowatt; rotary converters, 200 and 300 kilowatt; 5 horsepower motor, 4 speeds; 12 foot bridge, two 200 foot spans long; and a 1280 foot aerial tramway, with an hourly capacity of 100 tons of coal.

WHEELING, W. VA.—Wheeling Steel Corp. has purchased the building of the Arteraft Metal Co., Martins Ferry, O., to provide additional space for one of its three plants there, the Wheeling Corrugated company's present factory being too small.

Tennessee

KNOXVILLE, TENN. — Tennessee Valley Authority receives bids Feb. 3 for furnishing material, labor, tools and equipment for the installation, fabrication, etc., of an automatic electric elevator for Wheeler power plant.

NASHVILLE, TENN.—Board of public works receives bids Jan. 28 for furnishing materials, tools, equipment, etc., for installing 430 feet of 16-inch Class 150 cast iron bell and spigot water pipe, fittings, valves, etc.

Missouri

ST. LOUIS—St. Zavier Mining Co. has been incorporated by Sam D. Agostino and H. E. Zollar.

ST. LOUIS—Pantkraft Mfg. Co. has been incorporated by A. Goodman, 700 Limit street, and Simon Goodman.

Arkansas

EUDORA, ARK.—Breece-White Mfg. Co. has been incorporated by Carl L. White Sr. and A. B. Vaughters.

FORDYCE, ARK.—Hugh B. Benton is contemplating the rebuilding of a recently-burned chair plant in this city.

Oklahoma

MORELAND, OKLA. — City will soon begin the construction of a $35,000 power plant. Benham Engineering Co., Perrine building, Oklahoma City, Okla., is consulting engineer.

NASH, OKLA.—Farmers Co-operative Elevator Co. will erect a 60,000-bushel elevator and increase its storage capacity.

TULSA, OKLA. — Emmons Electric Mfg. Co. has been incorporated by D. E. Emmons, 1017 East Sixth street, and LeRoy Mitchell.

Texas

DALLAS, TEX.—Bramblett Mill & Mfg. Co., Jerden and Lang streets, suffered loss by fire to its plant here recently.

FORT WORTH, TEX.—Marion Herring Boat Works Inc. has been incorporated by Marion E. Herring and George Q. McGown Jr., 2320 West Rosedale street.

HOUSTON, TEX.—Treasury department, office of supervising architect, Washington, asks bids Feb. 13 for freight elevators to be installed in the United States parcel post building here.

HOUSTON, TEX. — Brance-Krachy Corp., 1901 Caroline street, has acquired a site on Navigation boulevard for the erection of a plant to be used in the manufacture of electrical equipment. The project calls for either the remodeling of buildings on the site or the erection of new ones.

Wisconsin

MILWAUKEE—Stroh Die Moulded Castings Co., 525 East Michigan street, has been incorporated to manufacture tools, dies, etc., by Donald Stroh, Arthur L. Bach, and H. M. Blume.

PORT WASHINGTON, WIS.—J. E. Gilson Co., manufacturer of castings, garden tools, and other products, plans the construction of an addition to its foundry, to be 60 x 70 feet.

Minnesota

COKATO, MINN.—Minnesota Valley Canning Co. plans construction of a new canning factory, 84 x 112 feet, and a power house, 24 x 40 feet. Considerable machinery and equipment, including conveyors, will be installed.

MINNEAPOLIS—Sands Mfg. Co., 720 South Fourth street, has been incorporated to manufacture metal folding stands for golf bags and other metal products, by Walter Sands, Victor J. Hermel, and Gerald E. Sundkvist.

MINNEAPOLIS — Harriet Woodwork Co. has been incorporated to manufacture sash and door products, by Algot S. Johnson, Ernest H. Gustavson, Carl W. Anderson, and David R. Anderson.

MINNEAPOLIS—Trustees of the Minnesota & Ontario Paper Co. have been granted a request for permission to spend $82,500 of the firm's funds for new machinery and equipment. Of the total, $65,000 will be spent in a hardboard plant of the Insulite Co. of Finland and $17,500 for kraft paper machinery at the plant at International Falls, Minn.

ST. PAUL—Minneapolis-St. Paul sanitary district will take bids early this spring for the construction of a sewage disposal plant, to cost about $3,400,000, including $250,000 for screen and grit chambers and $800,000 for settling tanks. The general plans call for a building about 400 x 500 feet, capable of handling 134,000,000 gallons of sewage per day. C. C. Wilbur is chief engineer for the sanitary district.

ST. PAUL—United States engineer, 615 Commerce building, asks bids soon for furnishing crane contact rail guard and screen systems at lock and dam No. 4, Alma, Wis., and lock and dam No. 5, Whitman, Wis. Withdrew bids to have been opened Jan. 7.

ST. PAUL — St. Paul Welding & Mfg. Co., 174 West Kellogg boulevard, manufacturer of welding equipment, plans construction of a 1-story welding shop and factory, 40 x 100 feet. M. A. Wright, 288 Bunker street, is architect.

Iowa

DAVENPORT, IOWA—Brammer Mfg. Co. has been incorporated to manufacture washing machines and laundry equipment. Harry Braunlich is president and W. C. Gehrmann is secretary. The new company succeeds the old Brammer Washing Machine Co.

WATERLOO, IOWA—Schoitz Tool, Gear & Machine Works, 221 West Sixth street, O. A. Schoitz proprietor, has acquired an adjoining 2-story building, 45 x 90 feet, for expansion purposes, which will be remodeled for machine shop and manufacturing work. Additional machinery and equipment will be installed.

Nebraska

OMAHA, NEBR.—Cardinal Supply & Mfg. Co. has been incorporated to manufacture and distribute tools and machinery, by Fred C. Fuller, Richard G. Lowry, and Alva S. Rice.

OMAHA, NEBR.—Vacuum Tile Products Co., 1913 Leavenworth road, has been incorporated by R. I. Edmunds, D. J. Killen, and J. M. Anderson, W. H. Peters, and F. M. Gore.

Montana

MILES CITY, MONT.—Elk River Concrete Products Co. of Montana, affiliated with the Elk River Concrete Products Co., Elk River, Minn., has started construction of a factory, 30 x 80 feet, in which new equipment and machinery will be installed for the manufacture of concrete pipe. E. H. Eby, Helena, Mont., is president and manager.

Nevada

VIRGINIA CITY, NEV.—Castle Peak Quicksilver Co., whose property is near this city, will enlarge its operating facilities. H. E. Loufek, 233 East Plaza street, Reno, Nev., is manager.

Idaho

DEARY, IDAHO — Voters here have approved a proposal to build a city water system, using cast iron. WPA funds have been allocated.

Pacific Coast

BAKERSFIELD, CALIF.—Plans are being prepared for the construction of a hangar and shop building for Kern county airport, which will be 132 x 300 feet and require 150 tons of structural steel, metal siding, steel sash, steel rolling doors, etc. Cost will be $100,000 and architects are Charles H. Biggar, 554

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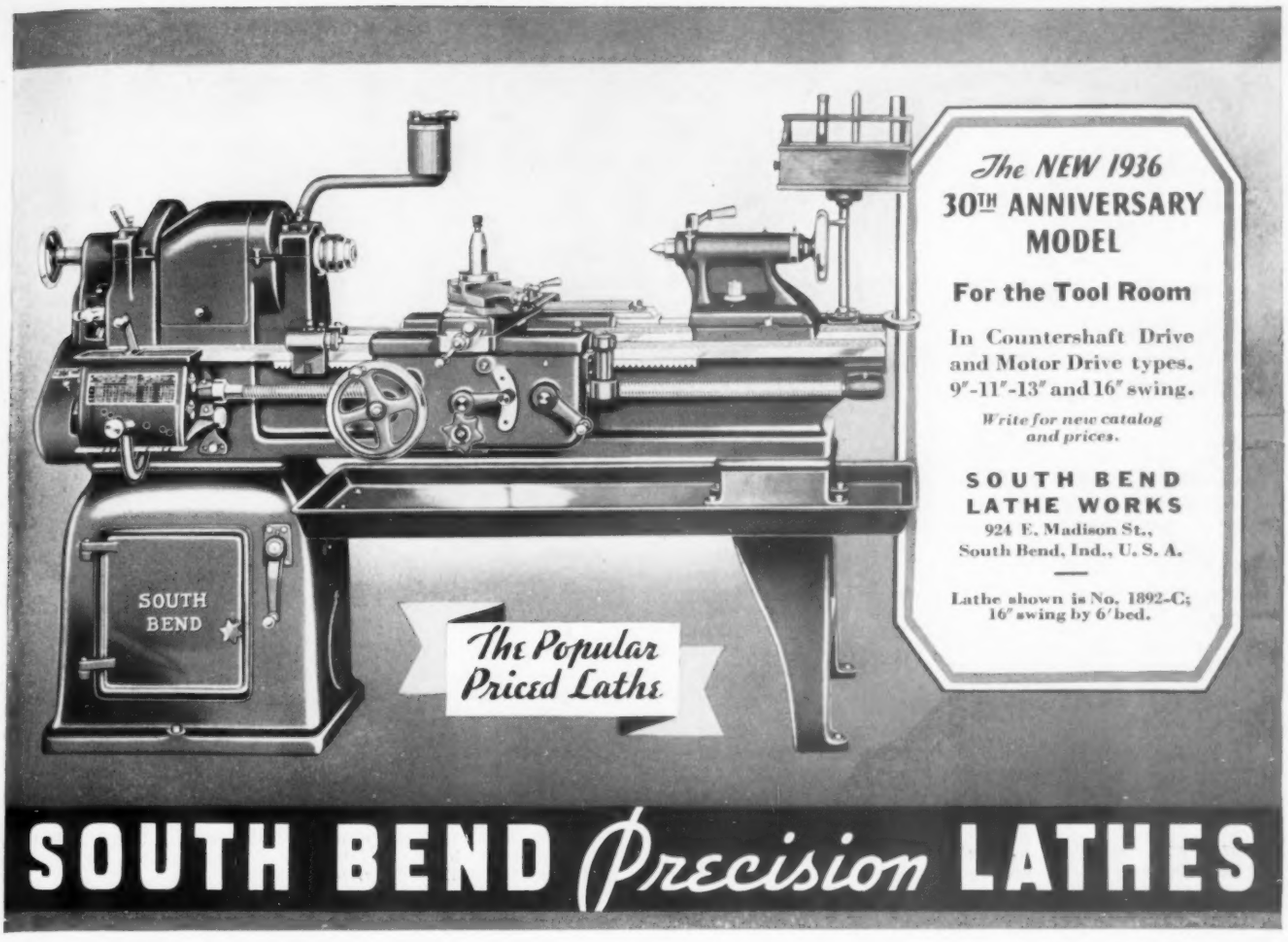
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Haberfelde building, and L. H. Nishkian, 525 Market street, San Francisco.

LONG BEACH, CALIF.—Structural Engineer William J. Moran, 1011 South Fremont street, Alhambra, Calif., is preparing plans for a linseed oil manufacturing plant to be built on a 6-acre site south of Cerritos channel on the west side of Ford avenue, this city, for Spencer Kellog & Sons, Buffalo.

PASADENA, CALIF.—Herbert A. Hamm, 579 North Holliston avenue, engineer, has prepared plans for the construction of a pre-cooling plant to be built at 2690 Foothill boulevard, for the Sierra-Madre-Lamanda Citrus association. Estimated cost is $11,000.

SAN FRANCISCO—Bethlehem Shipbuilding Co., this city, plans the expenditure of approximately $2,000,000 for the rehabilitation of its Potrero plant, Twenty-second and Illinois streets.

SAN JOSE, CALIF.—Food Machinery Corp., 333 West Julian street, plans alterations to its plant to cost $6000.

SANTA MONICA, CALIF.—Architect Edward Cray Taylor, 803 West Third street, Los Angeles, is preparing plans for the construction of a large hangar, to be erected at 300 Ocean Park avenue for the Douglas Aircraft Co. An addition to the company's factory is already under way.

CENTRALIA, WASH.—Davis Winery Inc. has been organized here by P. E. Davis and associates, to build and operate a plant at Grapeview, Wash.

COLVILLE, Wash.—Colville Indian tribal council has voted to request a loan of $120,000 from the Resettlement administration to purchase the West Fork sawmill. Plans include $10,000 for a new planing mill and $10,000 for new logging equipment.

SEATTLE — Washington Nickel Mining & Alloys Inc. has been organized by James G. Stephens and associates, 222 Fairview avenue, north.

SEATTLE—Continental Can Co. will build a $110,000 addition to its main plant building at 615 Orchard street, to be constructed of reinforced concrete, 3-story, 120 x 150 feet. This is in addition to the $40,000 expansion to the forge and pattern shop.

Dominion of Canada

VANCOUVER, B. C.—Standard Tent & Awning Co., Ltd., 925 Rogers building, 470 Granville street, is making plans for the construction of a factory here.

SAULT STE. MARIE, ONT. — Chromium Mining & Smelting Corp. Ltd. will soon take bids for construction of a third furnace at the company's plant and a 100-ton mill at the mine. Proposed work will cost $150,000.

TORONTO, ONT.—Department of agriculture marketing board, Ottowa, Ont., W. B. Somerset director, will soon take bids for constructing a new warehouse for fruit and vegetables, to cost $1,000,000. Architect has not been appointed.

WOODSTOCK, ONT.—Bickle Fire Engine Ltd. and Seagrave Fire Engine Ltd., St. Catharines avenue, both of this city, are merging and the firm name is being changed to Bickle-Seagrave Ltd., R. S. Bickle manager. Plans call for an addition to the factory and installation of new equipment.

Foreign

LONDON, ENGLAND—British government plans improving railroads and highways including electrification of tracks, new stations, automatic train controls, and general modernization of equipment on the Great Western railway, London, Midland & Scottish railway, London & Northwestern railway, and Southern railway. Cost of the program is $650,000,000. Direct government grants will match the local funds.

HONOLULU, HAWAII — Actual construction will begin soon on the new United States army air base 8 miles from here, close by Pearl Harbor naval base. The government has made $4,500,000 available for preliminary construction work on the 2500-acre field. The total cost of the project is estimated at $11,000,000. Immediate construction plans call for four double hangars, one operations hangar, and water and sewer lines. Two years will be required for completion of the program of work on Hickam field, as the new base will be called.

MEXICO CITY, MEXICO—National Railways of Mexico, this city, plans rebuilding the railway between Matamoros and Monterrey, Mexico, including grading, bridging, heavy steel, electrical equipment, ties, stations, etc. Cost of project is to be 5,000,000 pesos.

Macklin Company Enlarges Plant for Manufacturing Abrasive Wheels

EXPANSION of plant facilities of the Macklin Co., Jackson, Mich., manufacturer of grinding wheels, has increased floor space 50 per cent and provided a new, modern office structure. Changes have been under way for some time and were completed recently, giving the company much better facilities for producing and handling its output. The Macklin Company was organized in 1927 and started operations in a small way with a few kilns and limited factory space. In 1929 demand for its products necessitated increased facilities, and additional kilns were added and manufacturing space was enlarged. Each year since then some addition has been made but growing demand for its wheels brought the necessity a few months ago for a greatly enlarged plant, fully doubling what had been done before. Equipment has been added to, more hydraulic presses being installed, and practically double the former volume of wheels is now possible. Additional electric ovens have been installed to balance other factors of production, and more lathes and other tools have been placed in the machine room. Air conditioning of the work rooms has improved working conditions. The stock room has been enlarged and a full line of abrasive wheels is carried to meet all demands of users of its products without delay.

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Railroads Continue Policy Of Rebuilding Older Tools

RAILROADS have been particularly sparing in their purchases of shop equipment the past several years. At the moment, however, carriers are commencing to give freer rein to their pursestrings, although few of them are in a position to spend liberally, and in most cases shops have trouble in getting an executive O.K. on all the appropriations they would like to see coming their way.

One western road recently had restricted its machinery purchases to repair parts for existing equipment. A certain machine tool in its shop was badly in need of rehabilitation, but, because of regulations, could not be replaced by a new unit. Consequently an order was placed for its rebuilding. When the machinery interest received the order he found that it called for replacement of practically every part of the unit except the base casting—and at a cost almost equal to that of a brand new machine. But of course he took the business.

Used equipment business in the Chicago district is holding up well and is heavier than a year ago. While deferred delivery on new machinery is helping sales of second-hand tools here, as in other sectors, sellers of the latter maintain that price and the actual need for equipment are the important factors. Better demand and a light supply of quality merchandise have boosted prices materially during the past 12 months. If the buyer will accept an old, obsolete type of tool, his wants are not hard to satisfy; if he is particular, he will find his choice of selection limited.

Practically all types of machine tools are affected by limited supplies of the better grades, though used stamping equipment in good condition is particularly scarce.

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